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ABSTRACT

This book features a set of problems assembled to reflect the criteria of the mathematics portion of the North Carolina High School Comprehensive Test. The problems are not necessarily suited to timed situations but rather are intended for classroom use by teachers to review high school mathematics and build upon concepts and skills developed in the middle school years. The problems are in a blackline master format, generally four items to a page, and in 18- or 24-point type for easy use as overhead transparencies. They are organized according to the Comprehensive Test criteria. (ASK)

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Resources for Grade Ten Mathematics

ED 435 542

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Mathematics/Science Section
NC Department of Public Instruction
June, 1999

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Resources for Grade Ten Mathematics is a set of problems assembled to reflect the criteria of the mathematics portion of the ***North Carolina High School Comprehensive Test***. The problems are not necessarily suited to timed situations but rather are intended for classroom use by teachers to review high school mathematics and build upon concepts and skills developed in the middle school years. Teachers can use the problems as class openers, problems-of-the-week, extra credit, periodic review, homework, and items on tests and quizzes.

The problems are in a blackline master format, generally four items to a page, and in 18- or 24-point type for easy use as overhead transparencies. They are organized according to the Comprehensive Test criteria. This document is also available in Acrobat (.pdf) format on the mathematics page at the NCDPI Instructional Services web site (**www.learnnc.org/dpi/instserv.nsf**).

Contents

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Answer Key (Please check the answers before sharing with students.) pp. 185-215

After you have had a chance to review and use these materials, please take a moment to let us know if ***Resources for Grade Ten Mathematics*** has been useful to you. Your evaluation is important for the Eisenhower project that supported the development of these materials. Please respond to:

Bill Scott
Mathematics and Science Section
Department of Public Instruction
301 N. Wilmington Street
Raleigh, NC 27601-2825

Indicate the extent to which you agree with statements 1-5.

	Strongly Disagree				Strongly Agree
The materials will be helpful in preparing students for the NC High School Comprehensive Test	1	2	3	4	5
I plan to use these materials with my students in (course) _____ .	1	2	3	4	5
The materials are appropriate for high school mathematics.	1	2	3	4	5
The format of the materials encourages their use.	1	2	3	4	5

How do you plan to use these materials in your classroom?

Additional comments:

5

Grade 10 Mathematics

Goal 1: This strand will focus on performing operations, solving problems, and representing mathematical relationships using real numbers.

1.01 The learner will perform operations with real numbers. pp. 2 - 11

1.02 The learner will solve problems involving number theory. pp. 12 - 21

1.03 The learner will use ratios, proportions, and percents to solve problems. pp. 22 - 30

Written in standard notation, $7.2 \cdot 10^3$ is equivalent to

(a) 0.0072
(b) 0.00072
(c) 7,200
(d) 72,000

The expression $\sqrt{500}$ is equivalent to

(a) $50\sqrt{10}$
(b) $5\sqrt{10}$
(c) $10\sqrt{5}$
(d) $10\sqrt{50}$

The expression $3\sqrt{27} - \sqrt{12}$ is equivalent to

(a) $7\sqrt{3}$
(b) $23\sqrt{3}$
(c) $15\sqrt{3}$
(d) $4\sqrt{3}$

The land speed record was set in 1997 by a Royal Air Force pilot traveling at an average speed of 763.035 mph. At that speed, how long would it take to drive from your town to San Francisco?

If $x = 13$, then the value of $\sqrt{x-5}$ is

(a) a rational number
(b) an irrational number
(c) undefined
(d) an integer

A certain machine produces 300 nails per minute. At this rate, how long will it take the machine to produce enough nails to fill five boxes of nails if each box will contain 250 nails?

(a) 4 minutes
(b) 4 minutes, 6 seconds
(c) 4 minutes, 10 seconds
(d) 4 minutes, 50 seconds
(e) 5 minutes

The expression $\sqrt{18} + \sqrt{32}$ is equivalent to

(a) $2\sqrt{7}$
(b) $5\sqrt{2}$
(c) $7\sqrt{2}$
(d) $13\sqrt{2}$

The population of the United States is approximately 250 million, and the national debt is approximately 4 trillion dollars. If this debt were divided equally among the population, what would be the debt, in dollars, per person?

(a) 16
(b) 1,600
(c) 16,000
(d) 1,600,000
(e) 16,000,000

Which number expresses 72 kilometers per hour as meters per hour?

(a) $7.2 \cdot 10^{-2}$
(b) $7.2 \cdot 10^{2}$
(c) $7.2 \cdot 10^{-4}$
(d) $7.2 \cdot 10^{4}$

If $a = -2$ and $b = 3$, what is the value of $-3a^2b$?

Linda was filling out her state income tax return. Her taxable income for the past year was $27,544. According to the tax rate schedule her tax is $765 plus 7% of the amount over $12,750. How much does she owe in state income taxes?

If $\sqrt{84}$ is simplified to $a\sqrt{b}$ such that a and b are integers, what is the value of a?

3

Which of the following is an irrational number?

(a) $\frac{2}{5}$

(b) 3π

(c) 4.13

(d) 4.135

Simplify: $\frac{6.4 \cdot 10^6}{3.2 \cdot 10^2}$

(a) $3.2 \cdot 10^4$
(b) $3.2 \cdot 10^3$
(c) $2 \cdot 10^4$
(d) $2 \cdot 10^3$

A sofa was purchased for $600 while on sale. If there was a 12% discount, what was the original retail price?

a $612
b $682
c $528
d $672

For what value of A is the expression

$A > \sqrt{A} > \frac{1}{\sqrt{A}}$ true?

(a) -4
(b) 0
(c) 1
(d) 9

10

Which of the following is an irrational number?

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(b) 3π

(c) 4.13

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(a) -4
(b) 0
(c) 1
(d) 9

Fill in the blank:

$(3^{12})^0$_____$(12^3)^0$

(a) >
(b) <
(c) =

In the picture, estimate the length from A to B.
(a) is less than 9
(b) is between 9 and 12
(c) is between 12 and 15
(d) is greater than 15

What is half of 2^{12}?

(a) 2^6
(b) 1^{12}
(c) 2^{11}
(d) 2^{10}

Fill in the blank:

$5^3 \cdot 5^4$_____$(\frac{1}{5})^3(5)^9$

(a) >
(b) <
(c) =

The sophomore class at East High School is planning a field trip. There will be one chaperone for each group of 20 students and 346 students are going. A bus can carry up to 58 people. How many empty seats will there be if each person going uses one seat?

The power rating of an appliance is the rate at which the appliance converts electrical energy. To calculate the power rating of an appliance in watts, the voltage is multiplied by the current. If a portable radio draws a current of 10 amps and is connected to a 120-volt power source, what is the power rating of the radio?

(a) 12 W
(b) 120 W
(c) 1,200 W
(d) 12,000 W

The speed of sound is 1,088 feet per second at 32°F at sea level. How fast is this speed in miles per hour?

If a, b, and c are real numbers, which statement is never true?

(a) $a + b = b + a$
(b) $a(b + c) = (a + b)(a + c)$
(c) $a(bc) = (ab)c$
(d) $a \cdot 0 = a$

How many digits does the number $25^{16} \cdot 2^{38}$ have?

The speed record for a commercial airliner traveling from New York to Los Angeles is 575.52 mph. The record from Los Angeles to New York is 680.90 mph. In minutes, how much faster is the west-to-east travel than the east-to-west if we are traveling at the record speeds?

Without using a calculator, list the numbers 2^{100}, 3^{75}, and 5^{50} in order from the smallest to the largest.

If the number 36,000,000 is written in scientific notation, the numerical value of the exponent is

(a) 6
(b) -6
(c) 7
(d) -7

In basketball the equation $P = 2x - x^2$ describes a player's theoretical chance of scoring at least one point in a two-shot free throw situation. P is the player's chance of scoring and x is the player's current free throw shooting percent expressed as a decimal. If Ray is a 79% free throw shooter, what is his chance of scoring at least one point the next time he is in a two-shot situation?

The speed limit along a particular highway increases from 55 mph to 65 mph. How much time will be saved on a 100 mile trip?

On a 20,000-mile trip, each tire spends the same number of miles on the road because the owner rotates them all, including the spare. How many miles does each tire spend on the road?

At the one-mile Phoenix International Raceway, the winning vehicle in Saturday's Supertruck Race had an average speed of 91 mph. On Sunday the stock cars raced and the winner averaged 102 mph. In seconds, how much longer does it take the winning truck to complete a mile compared to the winning stock car?

15

If the number 0.00048 is written in the form $4.8 \cdot 10^n$, what is the value of n?

Expressed in decimal form, the number $1.23 \cdot 10^{-3}$ is

(a) 1230
(b) 0.000123
(c) 0.00123
(d) 123,000

Vincent has cut three pieces of rope to complete a science project. Two pieces are of equal length. The third piece is one-quarter the length of each of the others. He cut the three pieces from a rope 54 meters long without any rope left over. Find the length of each piece of rope.

If the hypotenuse of a right triangle is six and one leg is five, the other leg is

(a) 7.8
(b) 61
(c) 3.3
(d) 11

16

The mean distance from the Earth to the Sun is 92.9 million miles. The next closest star to the Earth is Alpha Centari, four light years away. How many times farther is Alpha Centari from Earth than the Sun?
(one light year = $5.88 \cdot 10^{12}$ miles)

If $x = 4$ and $y = -1$, find the value of $3x^2y$.

In 1995 *Reader's Digest* reported a circulation of 15,103,830 and had a cover price of $2.25. If the magazine raises its price to $2.50 a copy, how many subscribers can the magazine lose and maintain the same gross income from magazine sales?

In 1986 Dick Rutan and Jeana Yeager completed a nonstop circumnavigation of the Earth in the *Voyager* aircraft. They followed a great circle path, 24,986.727 miles, and averaged 115.65 mph. How many days were they in the air?

Evaluate: 6!

A rubber ball rebounds to half the height it drops. If the ball is dropped from a rooftop 18 meters above the ground, what is the total distance traveled by the time it hits the ground the third time?

(a) 31.5 m
(b) 40.5 m
(c) 45 m
(d) 63 m

Jan had a bag of marbles. She gave half of them to James and then a third of the marbles still in the bag to Pat. She then had 6 marbles left. How many marbles were in the bag to start with?

(a) 18
(b) 24
(c) 30
(d) 36

There are two sequences of numbers: 2, 7, 12, 17, 22, … and 3, 10, 17, 24, 31, … . The number 17 occurs in both sequences. If the two sequences are continued, what is the next number that will be seen in both sequences?

From any vertex of a 4-sided polygon, 1 diagonal can be drawn.
From any vertex of a 5-sided polygon, 2 diagonal can be drawn.
From any vertex of a 6-sided polygon, 3 diagonal can be drawn.
From any vertex of a 7-sided polygon, 4 diagonal can be drawn.

How many diagonals can be drawn from any vertex of a 20-sided polygon?

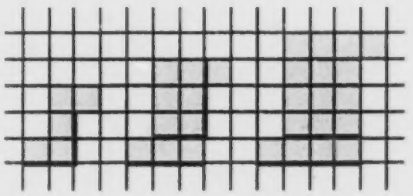
For any 4-sided convex polygon, 2 distinct diagonals can be drawn.
For any 5-sided convex polygon, 5 distinct diagonals can be drawn.
For any 6-sided convex polygon, 9 distinct diagonals can be drawn.

How many distinct diagonals can be drawn in a 20-sided polygon?

Which property is illustrated by the equation $3x - 6y = 3(x - 2y)$?

(a) associative
(b) commutative
(c) distributive
(d) multiplicative identity

The first three figures in a pattern of tiles are shown. The pattern of tiles contains 50 figures. Describe the 20^{th} figure in this pattern, including the total number of tiles it contains and how they are arranged.



Here is a sequence of three similar triangles. All of the small triangles are congruent. The sequence of similar triangles is extended to an eighth figure. How many triangles would there be in the eighth figure?

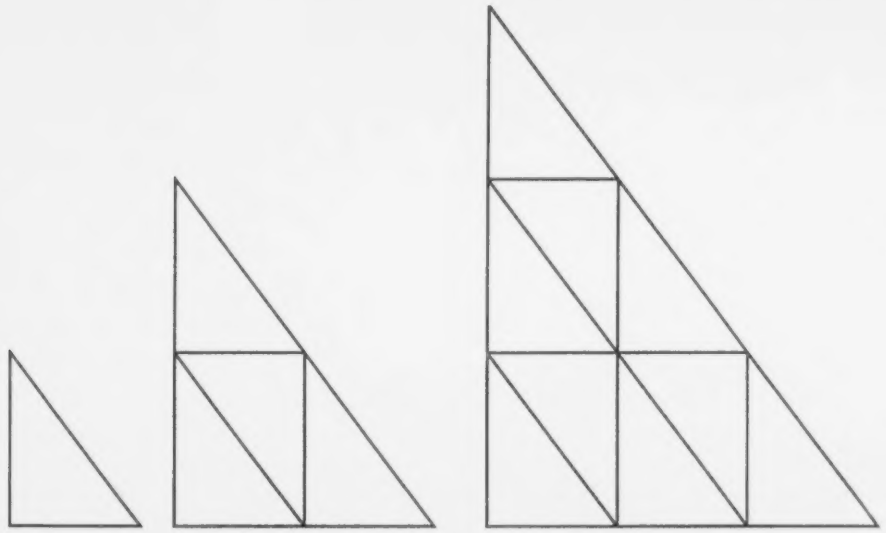


Figure 1 Figure 2 Figure 3

If x and y are integers, then the expression 4x + 5y has a value that is odd or even depending on the values of x and y. For example, if x and y are each even, 4x is even and 5y is even. Therefore 4x + 5y is even. Fill in each of the blank spaces in the following table with either odd or even.

Value of x	Value of y	Value of 4x + 5y
even	even	even
even	odd	
odd	even	
odd	odd	

20

What is the 100th digit to the right of the decimal point in the decimal form of $\frac{6}{37}$?

(a) 0
(b) 1
(c) 2
(d) 6

How many two-digit numbers are multiples of 7?

(a) 12
(b) 13
(c) 14
(d) 15

Find three numbers, all prime, whose product is 1955.

I can never remember my locker number, but I do remember that 6 and 25 are two of its twelve factors. What is my locker number?

Find the products, 37•3 and 37•6. What would you have to multiply 37 with in order to get a product where all the digits are five?

If two prime numbers differ by two, they are called twin primes. What are the largest twin primes less than 100?

(a) 59 & 61
(b) 71 & 73
(c) 87 & 89
(d) 89 & 91

What is the last digit of 2^{1000}?

(a) 2
(b) 4
(c) 6
(d) 8

What are the next two numbers in the sequence 18, 12.6, 8.82, 6.174, _____, _____ .

22

If a pyramid has ten edges, what is the shape of the base?

(a) square
(b) triangle
(c) decagon
(d) pentagon

What is the units digit of $3^{4^{19}}$?

(a) 1
(b) 3
(c) 7
(d) 9

$\frac{1}{4} = \frac{1}{5} + \frac{1}{20}$

$\frac{1}{5} = \frac{1}{6} + \frac{1}{30}$

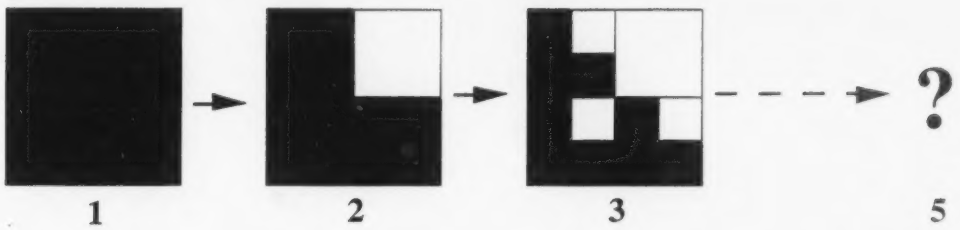
Express $\frac{1}{n}$ as the sum of unit fractions.

What is the remainder when 5^{193} is divided by 7?

(a) 2
(b) 3
(c) 4
(d) 5

23

In the fifth picture, how much of the original area would remain?



A bat ate 208 bugs in four hours. Each hour she ate 20 more than the previous hour. How many bugs did she eat in the third hour?

(a) 52
(b) 60
(c) 62
(d) 156

What is the missing number in the sequence?

2, 8, 27, 85,
260, _____, 2365

24

If the sum of the interior angles of a triangle is 180° and the sum of the interior angles of a quadrilateral is 360°, what is the sum of the interior angles of a dodecagon?

How much larger is the sum of the even numbers from 1 to 100, than the odd numbers from 1 to 100?

How many terms does the following sequence have?

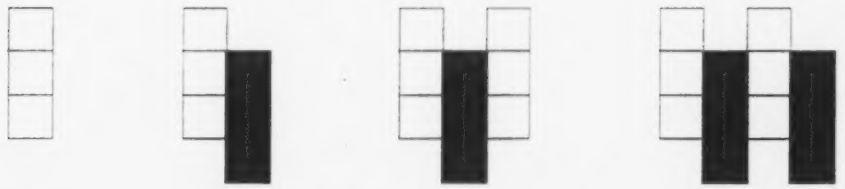
2.5, 4, 5.5, 7, ... , 17.5

Any number can be written as the sum of distinct powers of two. For example:
$73 = 2^6 + 2^3 + 2^0$.

Write 1,001 as the sum of distinct powers of two.

23

The figures in the sequence shown are composed of squares. If each square measures one centimeter on a side, what is the perimeter of the 12th figure in the sequence? What is the algebraic expression that describes the perimeters of the figures in the sequence?



Shown below is a sequence of figures composed of congruent squares. How many squares are in the 7th figure? If there are 150 squares available to build the sequence, how many complete figures could be built?

Express 53 as the sum of four or less perfect squares.

You have boxes that will hold one candy bar, three candy bars, nine candy bars, and 27 candy bars. If each box must be packed full, what is the fewest number of boxes you need to hold 377 candy bars?

In the pattern shown, what are the first two numbers after 200?

5, 6, 8, 9, 11, 12, 14, 15, 17, 18, ...

Find five consecutive even integers whose sum is -250.

A photograph 3 inches wide and 5 inches long is to be enlarged so that the length is 15 inches. The new width will be

(a) 9 in.
(b) 13 in.
(c) 17 in.
(d) 25 in.

If 20% of a number is equal to 3x, then the number is

(a) 0.15x
(b) 0.6x
(c) 6x
(d) 15x

Experts say that 25% of all serious bicycle accidents involve head injuries and that, of all head injuries, 80% are fatal. What percent of all serious bicycle accidents involve fatal head injuries?

(a) 16%
(b) 20%
(c) 55%
(d) 105%

A map is scaled so that one centimeter represents 15 kilometers. How far apart are two towns if they are 7.9 centimeters apart on the map?

(a) 1.9 km
(b) 7.1 km
(c) 22.9 km
(d) 118.5 km

The diameters of two circles are 8 and 12.5 centimeters respectively. Express as a percent how much greater in area the larger circle is than the smaller circle.

Luis mixed 6 ounces of cherry syrup with 53 ounces of water to make a cherry-flavored drink, Martin mixed 5 ounces of the same cherry syrup with 42 ounces of water. Who made the drink with the strongest cherry flavor?

Students were surveyed regarding what kind of car their parents had:

Chevrolet	43
Ford	82
Pontiac	12
Other	15

If 300 students were surveyed, about how many parents would say they owned Pontiacs?

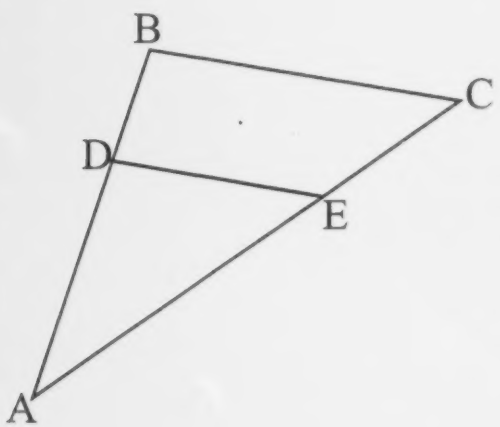
(a) 12
(b) 24
(c) 36
(d) 48

If ten cubic centimeters of blood contains 1.2 grams of hemoglobin, how many grams of hemoglobin would 35 cubic centimeters of the same blood contain?

A tree 24 feet tall casts a shadow 16 feet long at the same time a man 6 feet tall casts a shadow x feet long. What is the length of the man's shadow?

Two numbers are in the ratio 5:6. If the sum of the numbers is 66, find the value of the larger number.

In the diagram, $\overline{DE}$ is parallel to $\overline{BC}$, AD = 8, AB = 12, and EC = 5. Find AE.



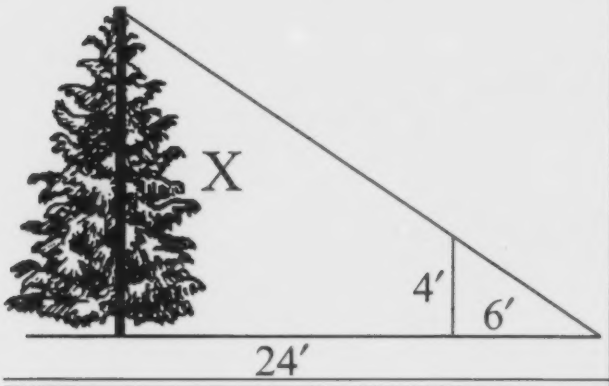
In three hours a car traveled 180 kilometers. At the same average rate, how many kilometers can the car travel in five hours?

30

To find the height of the tree, which proportion should be used?

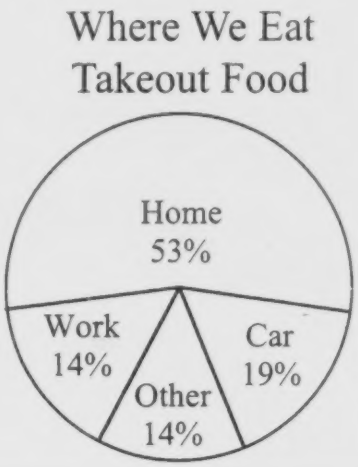
(a) $\frac{x}{24} = \frac{4}{30}$ (b) $\frac{24}{4} = \frac{6}{x}$

(c) $\frac{x}{4} = \frac{30}{6}$ (d) $\frac{24}{x} = \frac{6}{30}$



Based on the data in the graph, out of 500 people surveyed, about how many more will eat takeout food in their cars instead of at work?

(a) 5
(b) 25
(c) 50
(d) 170



Solve for the positive value of x: $\frac{(x - 4)}{5} = \frac{1}{x}$, $x \neq 0$.

Chris is buying three pairs of jeans for $34.99 each. He has a "25% off one item" coupon to use on his purchase. With 6% sales tax, what is the total amount he will pay?

(a) $111.27
(b) $104.97
(c) $101.99
(d) $83.45

31

A two-inch cube (2 • 2 • 2) of silver weighs 3 pounds and is worth $198.36. How much is a three-inch cube of silver worth?

(a) $297.54
(b) $446.31
(c) $669.47
(d) $555.41

Solve for x: $\frac{(x + 4)}{3x} = \frac{x}{12}$

The selling price of a car, $18,560, was determined by calculating an 8% markup from the dealer's cost. What did the dealer pay for the car?

(a) $20,044
(b) $17,075
(c) $14,848
(d) $17,185

If A is 50% larger than C and B is 25% larger than C, then A is what percent larger than B?

(a) 20%
(b) 25%
(c) 50%
(d) 100%
(e) 200%

32

Angela and Jennie both play on the basketball team. Angela made 38 out of 50 shots during the first half of the season and Jennie made 30 out of 40 attempts. During the second half of the season, Angela made 42 of 72 attempts and Jennie made 14 of 24. Who had the best shooting percent during the first half of the season? The second half? The entire season?

An island has no currency; it instead has the following exchange rate:

50 bananas = 20 coconuts
30 coconuts = 12 fish
100 fish = 1 hammock

How many bananas equal one hammock?

The price of gold goes up 10% the first month, goes down 10 % the second month, and goes up 10% the third month. By what percent did the price of gold change from its initial price to the end of the third month?

Julie purchased her stereo for $620.10, including 6% sales tax. If she had bought the stereo while visiting her grandmother in a neighboring state where the sales tax is only 4%, how much money could she have saved?

The official American flag has a length:width ratio of 1.9:1. A flag three meters long has stripes of what width?

A coat is sale priced at $130 as the result of a 40% reduction in the original price. If the sale price is then reduced by 10%, the new price is what percent of the original price?

Two opposite sides of a square are increased in length by 20% while the other sides decrease by 35%. Find the percent of change in the area of the figure.

In the first basketball game of the season, Becky made 7 field goals out of 20 attempts. In her next game Becky shot the ball 17 times. What is the fewest number of shots Becky could have made in the second game to raise her field goal percent above 50%?

34

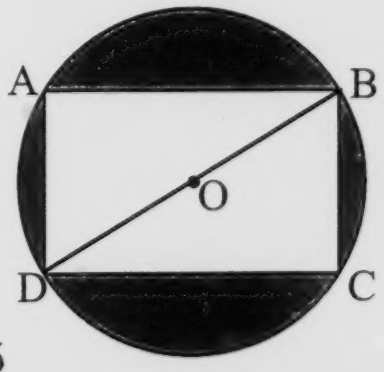
Suppose that you buy a stereo at 25% off the regular price but have to pay 6% sales tax. You can either take the discount first and then figure the sales tax or figure the sales tax first and then take the discount. Which is the better deal for you?

(a) sales tax first
(b) discount first
(c) it doesn't matter, the results are the same either way

Justin enters a game with a .283 batting average. After going 4-for-5 in the game, he has a .305 batting average. How many times had he batted before the game began?

The price per share of stock in an internet company in 1998 grew from $13.97 on Jan 2 to $92.06 on Dec 31. As a percent, how much has the value of the company's stock increased over the course of the year?

In the diagram, ABCD is a rectangle inscribed in the circle O. The ratio AB to BC is 4:3. The area of the rectangle is 48 square centimeters. Find DB in centimeters. Find the area of the shaded portion in terms of π.



35

Linda was filling out her federal income tax return. Last year she had taxable income of $27,489. According to the tax rate schedule her tax is $3,802.50 plus 28% of the amount over $25,350. According to her records, Linda has already paid $3,900 in federal income tax. How much does she still owe?

(a) $4401.42
(b) $501.42
(c) $7696.92
(d) $598.92

Mr. Tucci's Earth Science class went to the football field to lay out a scale model of the solar system. If the Sun is located on one goal line and Pluto is on the opposite goal line, where should the Earth be located? Jupiter? the other planets? (Mean distances to the Sun: Pluto, 5.9 billion kilometers, Earth, 149.6 million kilometers, and Jupiter, 778.3 million kilometers.

The lengths of the sides of a triangle are 6, 8, and 12. If the length of the shortest side of a similar triangle is 10, what is the length of its longest side?

Island nations tend to be more crowded than those on the continent. Japan has a population of 125,107,000 and area of 135,850 square miles. Great Britain has a population of 58,135,000 and an area of 94,251 square miles. Which nation is more crowded?

36

Grade 10 Mathematics

Goal 2:This strand will focus on describing, defining, and using the properties of plane and solid figures and solving related problems and using methods and systems of measurement, both direct and indirect, customary and metric, and solving related problems.

2.01 The learner will solve geometric problems using two- and three-dimensional shapes. pp. 32 - 46

2.02 The learner will use properties of angles, lines, and planes to solve problems. pp. 47 - 56

2.03 The learner will understand and use perimeter, area, and volume formulas to solve problems. pp. 57 - 69

2.04 The learner will solve problems using triangle relationships. pp. 70 - 79

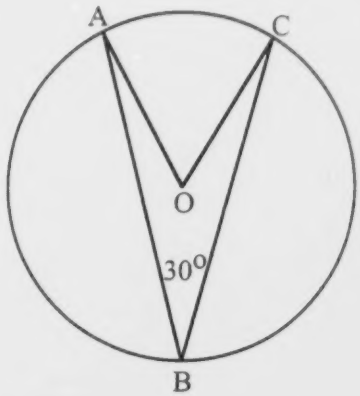
2.05 The learner will transform polygons in the coordinate plane. pp. 80 - 86

37

The sides of a triangle measure 2, 3, and 4. If the shortest side of a similar triangle measures 8, then the measure of the longest side is

(a) 10
(b) 12
(c) 14
(d) 16

In the diagram of circle O, m∠ABC = 30. Find the number of degrees in the measure of acute angle AOC.



In the diagram, ∠BCD is an exterior angle of ΔABC. If the m∠A = 25 and the m∠B = 85, find the number of degrees in the measure of angle BCD.

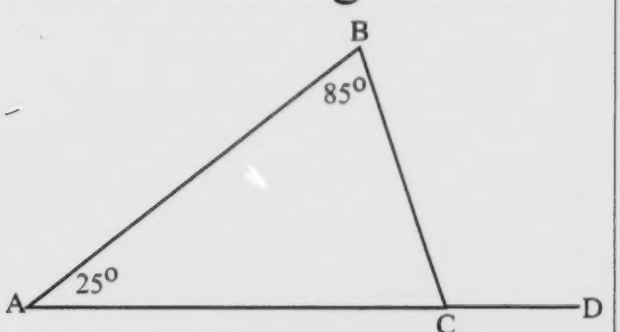
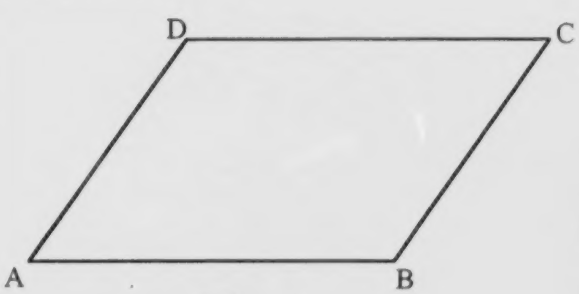
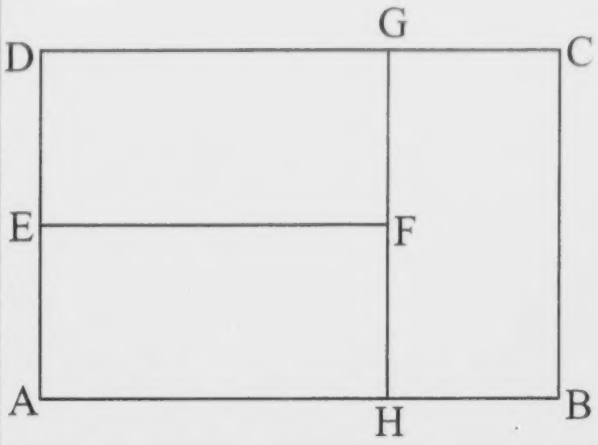


Figure ABCD is a parallelogram. Which statement must be true?
(a) The sum of the measures of the four angles is 180°.
(b) ∠A and ∠B are complementary.
(c) ∠A and ∠B are congruent.
(d) ∠A and ∠B are supplementary.



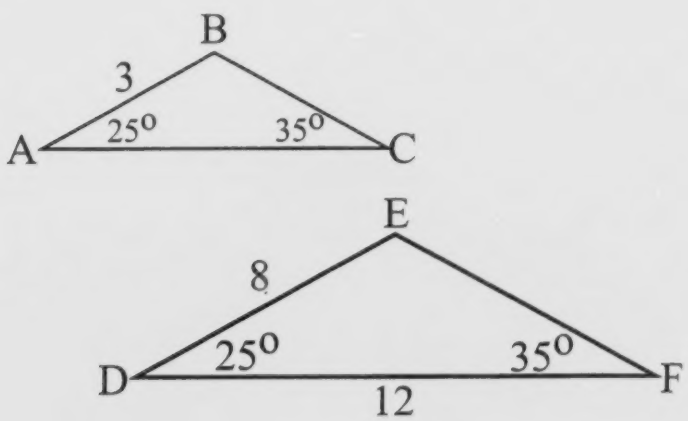
The vertex angle of an isosceles triangle measures 58°. Find the measure of a base angle.

In the diagram, rectangles DGFE, EFHA, and GHBC are congruent and AH = 4. Find the ratio AB:BC.



ΔABC and ΔDEF are similar triangles. What is the length of $\overline{AC}$?

(a) 2
(b) 4
(c) 4.5
(d) 5.5
(e) 32

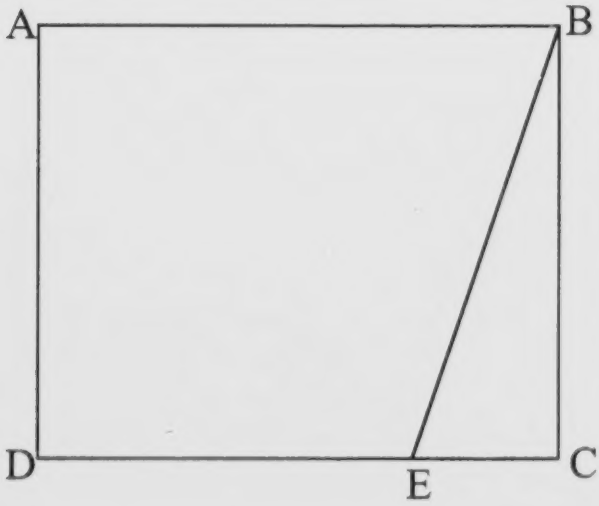


In which quadrilateral are the diagonals always congruent?

(a) rectangle
(b) trapezoid
(c) rhombus
(d) parallelogram

If a rectangle is not a square, what is the greatest number of lines of summetry that can be drawn?

In the diagram, ABCD is a rectangle with E a point on $\overline{DC}$. If EC = 5, BE = 13, and AB = 20, find the area of trapezoid ABED.



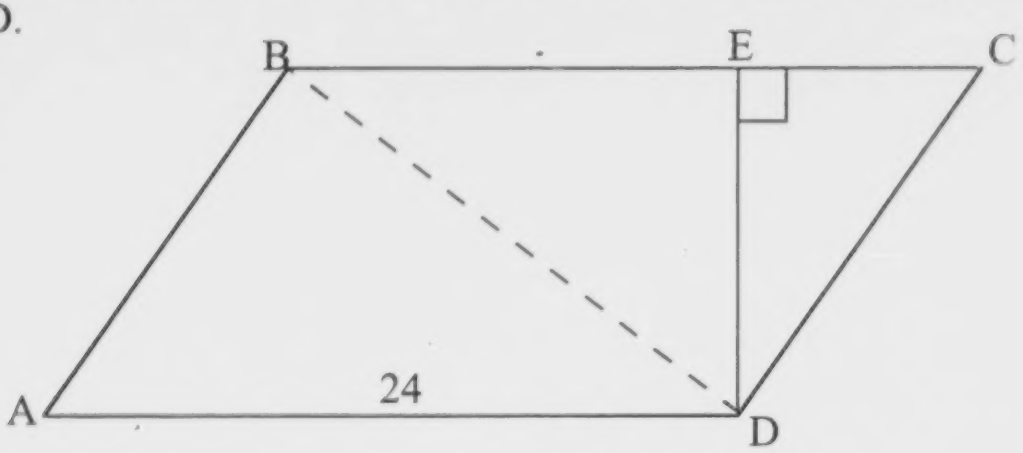
What is the measure of the largest angle of a triangle whose angle measures are in the ratio of 2:3:4?

(a) 20°
(b) 40°
(c) 60°
(d) 80°

40

In the diagram, ABCD is a parallelogram, $\overline{DE}$ is perpendicular to $\overline{BC}$, and AD = 24.

If AB = 2x + 4 and CD = x + 7, find the length of $\overline{CD}$. If the lengths of $\overline{EC}$ and $\overline{BE}$ are in the ratio 1:3, find the length of $\overline{EC}$. Find the length of $\overline{ED}$. Find the area of ABD. Find the area of trapezoid ABED.

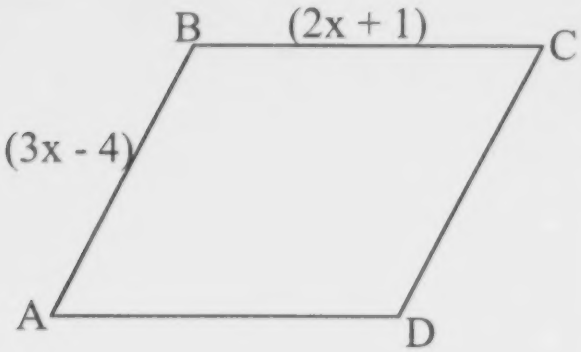


A quadrilateral with exactly one pair of parallel sides is a

(a) rhombus
(b) rectangle
(c) square
(d) trapezoid

If the measures of the angles of a triangle are in the ratio 1:2:3, find the number of degrees in the smallest angle.

In the diagram of rhombus ABCD, the lengths of $\overline{AB}$ and $\overline{BC}$ are represented by (3x - 4) and (2x + 1), respectively. Find the value of x.

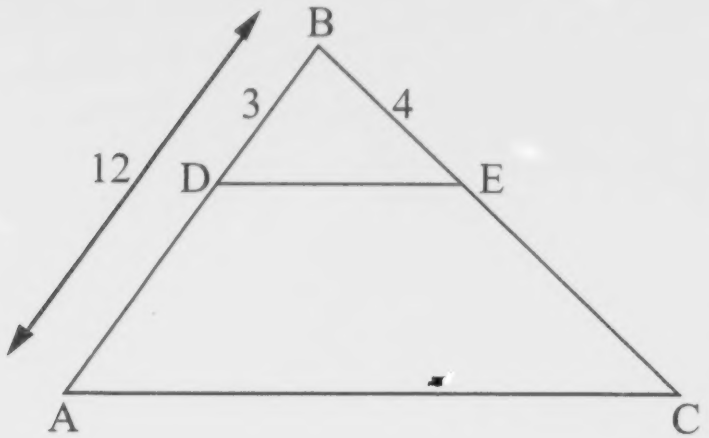


The measure of the vertex angle of an isoceles triangle is three times the measure of a base angle. Find the number of degrees in the measure of a base angle.

ABCD is a parallelogram with vertices A(2, 0), B(7, 0), C(10, 3), and D(5, 3). What is the area of parallelogram ABCD?

The lengths of the sides of a triangle are 3, 4, and 6. If the length of the shortest side of a similar triangle is 5, find the length of its longest side.

In the diagram of ΔABC, $\overline{DE}$ is parallel to $\overline{AC}$. If BD =3, BE = 4, and AB = 12, find the length of $\overline{EC}$.



In right triangle ABC, altitude CD is drawn to hypotenuse AB. If CD = 4 and AD = 2, find DB.

In parallelogram ABCD, the coordinates of A are (3, -1) and the coordinates of C are (-1, 5). Find the coordinates of the point of intersection of the diagonals.

Two consecutive angles of a parallelogram have measures $(3x - 2)^\circ$ and $(4x + 7)^\circ$. Find x.

In ΔABC, the measure of an exterior angle at B is 100°. If $m\angle A$ is four times $m\angle C$, find $m\angle C$.

Find the sum in degrees of the interior angles of a convex polygon with eight sides.

(a) 540°
(b) 720°
(c) 1080°
(d) 1440°

In ΔABC, $m\angle A : m\angle B : m\angle C = 2 : 3 : 4$. What is $m\angle C$?

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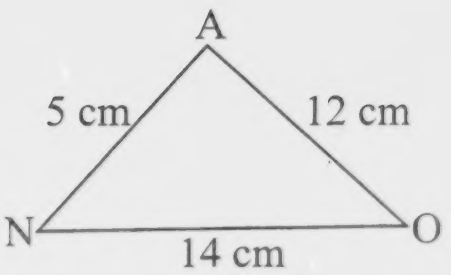
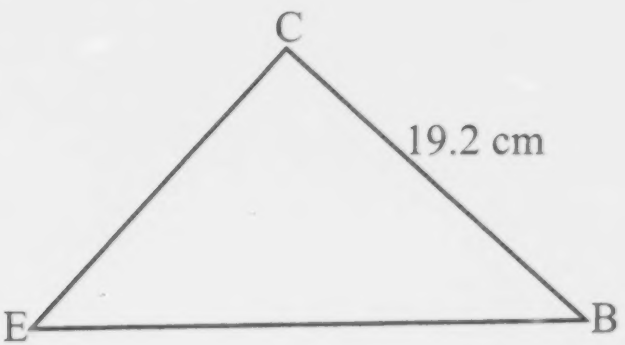
ΔAON is similar to ΔCBE.

What is the length of $\overline{BE}$?



(a) 17.5 cm
(b) 22.4 cm
(c) 30.8 cm
(d) 37.4 cm



What is the equation of a circle with center (-2,7) and radius 9?

(a) $(x - 2)^2 + (y + 7)^2 = 81$
(b) $(x + 2)^2 + (y - 7)^2 = 81$
(c) $(x - 2)^2 + (y + 7)^2 = 3$
(d) $(x + 2)^2 + (y - 7)^2 = 3$

What is the radius of a circle with equation $x^2 + (y + 5)^2 = 9$?

(a) 3
(b) 4
(c) 5
(d) 6

Joyce sighted to the top of a tree along a stake that she knew to be 3 feet high. If she is standing 2 feet from the stake and 18 feet from the tree, how high is the tree?

(a) 20 feet
(b) 21 feet
(c) 24 feet
(d) 27 feet

The measure of an interior angle of a regular polygon is 144°. How many sides does the polygon have?

(a) 4
(b) 6
(c) 8
(d) 10

Given A(-4,5), B(-1, -4), and C(6, -4) and ABCD is a parallelogram. What are the vertices of D?

(a) (5,5)
(b) (3,5)
(c) (3,4)
(d) (1,4)

If the coordinates of quadrilateral MNOP are M(7,6), N(-6,1), 0(-4,-3), and P(9,2), what type of quadrilateral is MNOP?

a) trapezoid
(b) rhombus
(c) square
(d) rectangle

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In a triangle, one exterior angle measures 36°. What is the probability that the triangle is a right triangle?

(a) 1

(b) $\frac{2}{3}$

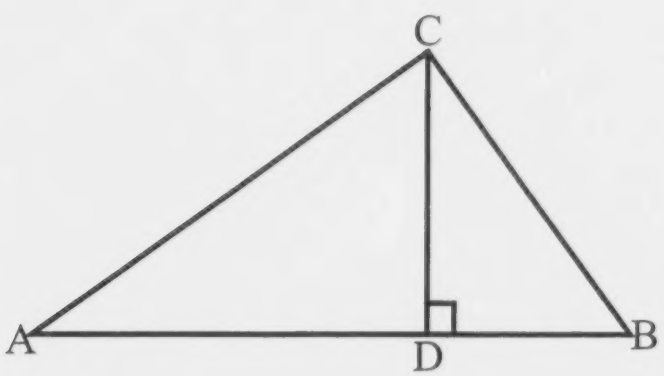
(c) $\frac{1}{2}$

(d) 0

Two triangles are congruent if

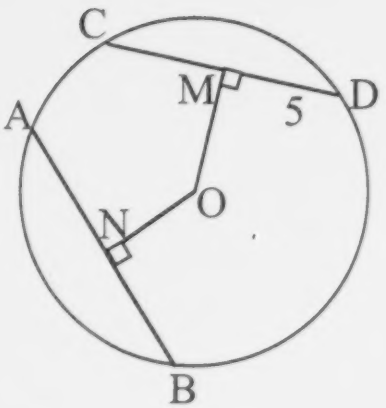
(a) corresponding angles are congruent
(b) corresponding sides and corresponding angles are congruent
(c) the angles in each triangle have a sum of 180°
(d) corresponding sides are proportional

In the diagram of right triangle ABC, $\overline{CD}$ is drawn perpendicular to hypotenuse $\overline{AB}$. If AB = 16 and DB = 4, find BC.



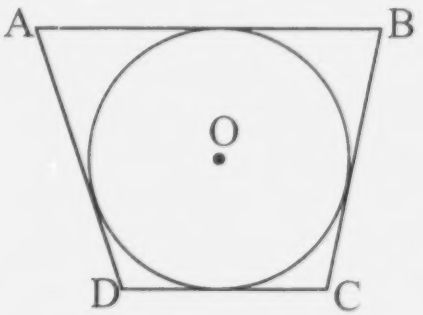
If $\overline{AB}$ and $\overline{CD}$ are chords of circle O and $\overline{ON} \cong \overline{OM}$, then find AB.

(a) 5
(b) 10
(c) 15
(d) 20



$\overline{AB}$, $\overline{BC}$, $\overline{CD}$ and $\overline{AD}$ are tangents to circle O, AB = 21, BC = 17, and CD = 10. Find AD.

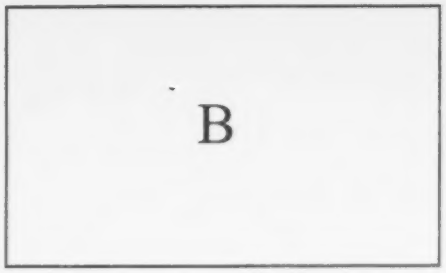
(a) 6
(b) 10
(c) 14
(d) 28

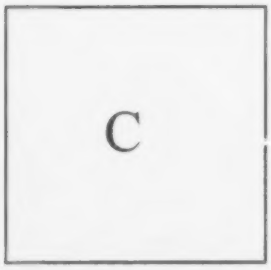


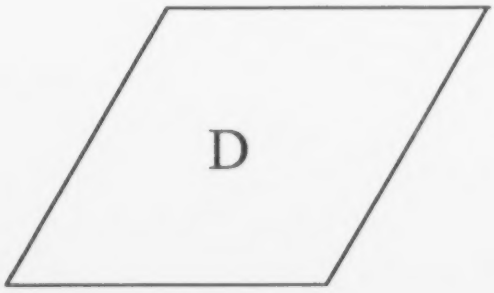
In ΔABC, $m\angle A = 41°$, $m\angle B = (2x - 37)°$, and $m\angle C = (3x - 29)°$. Which side of the triangle is the shortest?

In parallelogram LMNO, an exterior angle at vertex O measures 72°. Find $m\angle L$.

Which of the following is a regular convex polygon?







In ΔABC, $AB = 10$ and $BC = 5$.
Which expression can be true?

(a) $AC = 5$
(b) $AC < 5$
(c) $AC > 5$

What is the radius of the circle whose equation is $(x - 5)^2 + (y - 3)^2 = 4$?

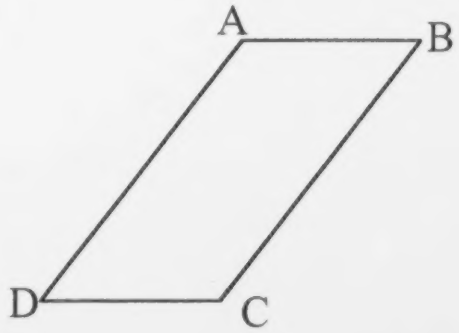
(a) 2
(b) 3
(c) 4
(d) 5

How many different squares are there in this rectangular grid?

(a) 8
(b) 11
(c) 12
(d) 16

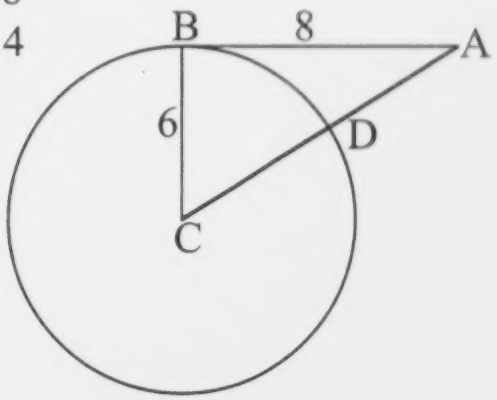
ABCD is a parallelogram. Which pair of angles is congruent and acute?

(a) $\angle B$ and $\angle D$
(b) $\angle A$ and $\angle B$
(c) $\angle C$ and $\angle B$
(d) $\angle D$ and $\angle A$



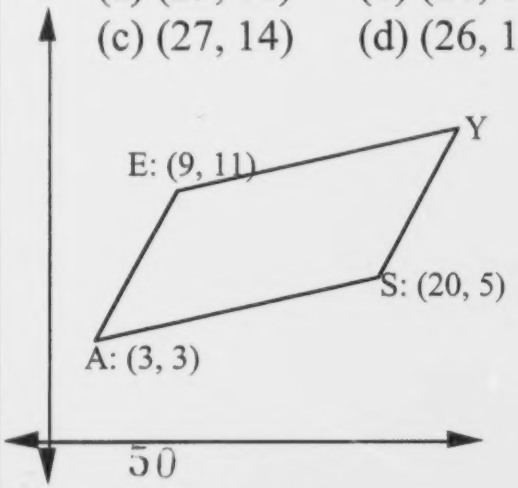
Given circle C with $\overline{AB}$ tangent at point B and secant $\overline{AC}$. Find AD.

(a) 16
(b) 10
(c) 8
(d) 4

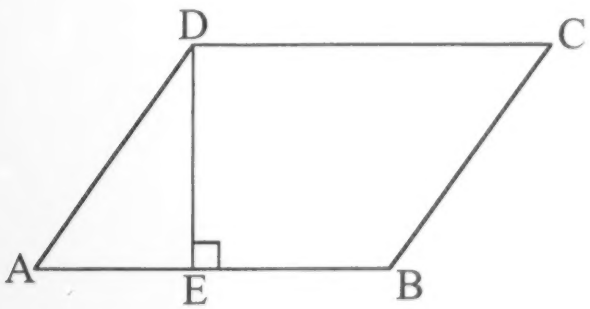


EASY is a parallelogram with the coordinates of points E, A, and S given. What are the coordinates of point Y?

(a) (29, 11) (b) (28, 11)
(c) (27, 14) (d) (26, 13)

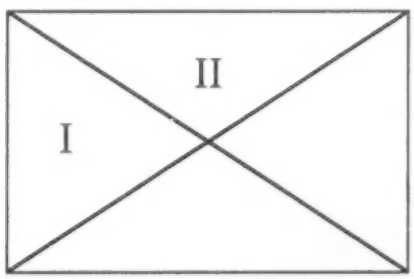


In the diagram ABCD is a parallelogram with altitude $\overline{DE}$ drawn to side $\overline{AB}$. If DE = AE, find the measure of $\angle A$.

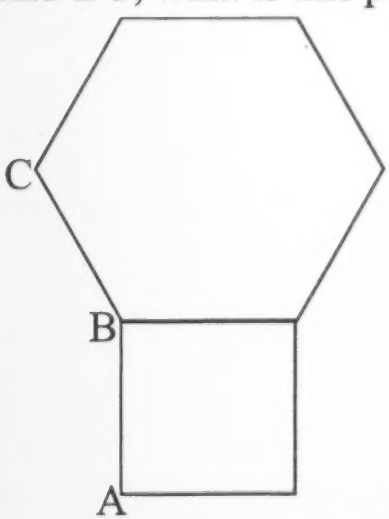


Find the ratio of the area of triangle I to triangle II in the rectangle.

(a) 1:2
(b) 1:4
(c) 1:1
(d) not enough information



Point B is a mutual vertex of a regular hexagon, a square, and a third regular polygon. If two of the sides of this third polygon are $\overline{AB}$ and $\overline{BC}$, what is this polygon?



In right triangle ABC, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$. If AD = 5 and DB = 24, what is the length of $\overline{CD}$?

(a) 120
(b) 5.48
(c) 10.95
(d) 21.91

The sides of a triangle have lengths 3, 5, and 7. In a similar triangle, the shortest side has length (x - 3), and the longest side has length (x + 5). Find the value of x.

In ΔABC, $\overline{AC}$ is extended through C to D and $m\angle DCB = 60^\circ$. Which is the longest side of ΔABC?

Which is an equation of the circle whose center is the origin and whose radius is 4?

(a) $y = x^2 + 8$
(b) $x^2 + y^2 = 4$
(c) $x^2 + y^2 = 16$
(d) $x + y = 8$

In parallelogram ABCD, diagonal $\overline{BD}$ is drawn. Which statement must be true?

(a) ΔABD must be an obtuse triangle
(b) ΔCDB must be an acute triangle
(c) ΔABD must be an isosceles triangle
(d) ΔABD must be congruent to ΔCDB

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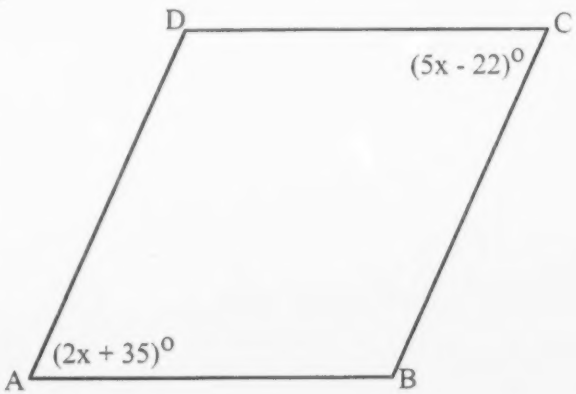
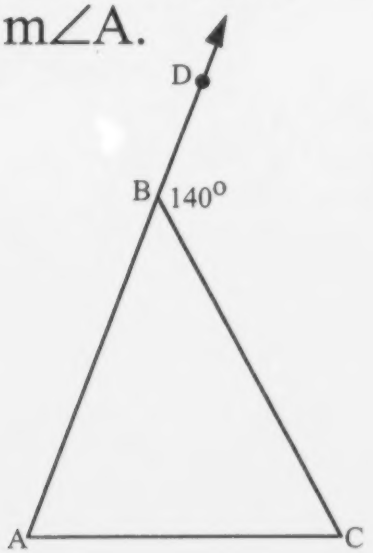
Two complementary angles are in the ratio 3:2. The number of degrees in the smaller angle is

(a) 18
(b) 36
(c) 54
(d) 72

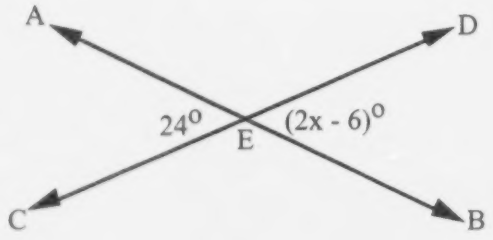
ABCD is a parallelogram, $m\angle A = 2x + 35$, and $m\angle C = 5x - 22$. Find the value of x.



In isosceles triangle ABC, AB = CB, point D is on $\overline{AB}$, and $m\angle CBD = 140$. Find $m\angle A$.

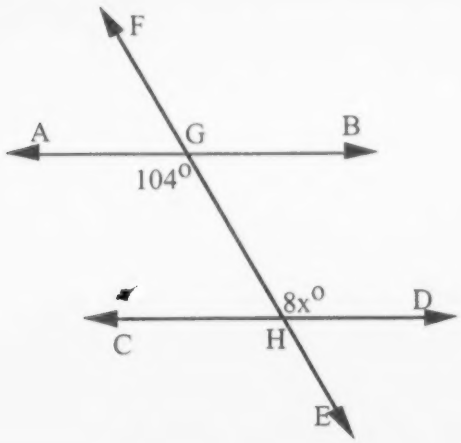


In the diagram, $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersect at E and $m\angle AEC = 24$. If $m\angle DEB = 2x - 6$, find x.

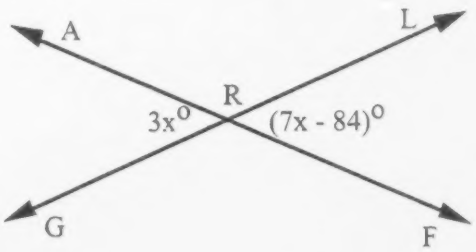


53

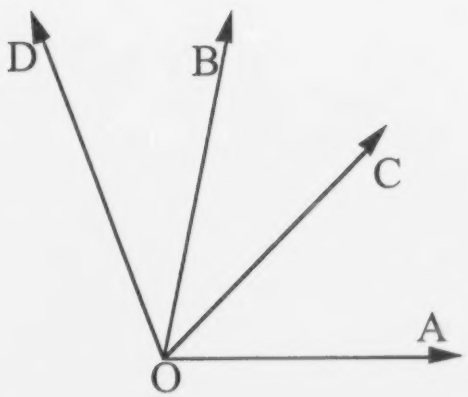
In the diagram, $\overleftrightarrow{AB}$ is parallel to $\overleftrightarrow{CD}$ and $\overleftrightarrow{EF}$ intersects $\overleftrightarrow{AB}$ at G and $\overleftrightarrow{CD}$ at H. If $m\angle AGE = 104$ and $m\angle DHG = 8x$, what is the value of x?



In the diagram, $\overleftrightarrow{AF}$ and $\overleftrightarrow{LG}$ intersect at R, $m\angle LRF = 7x - 84$ and $m\angle ARG = 3x$. What is the value of x?

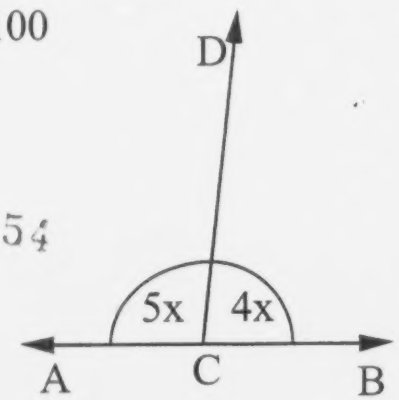


In the figure, $m\angle AOB = 70°$, $m\angle COD = 60°$, and $m\angle AOD = 100°$. What is $m\angle COB$?

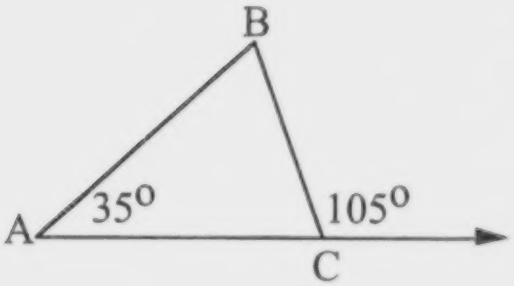


In this figure $\overleftrightarrow{AB}$ is a straight line. What is $m\angle BCD$?

(a) 20
(b) 40
(c) 50
(d) 80
(e) 100

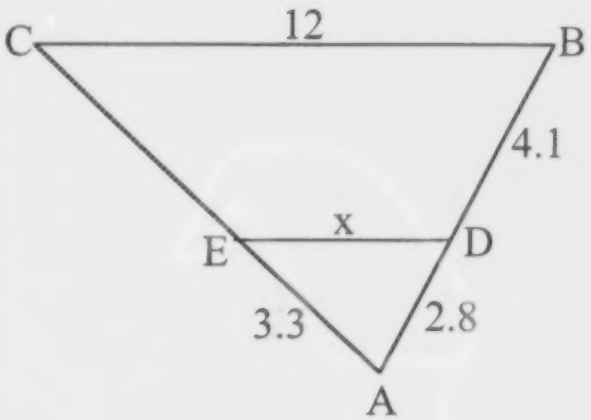


In the diagram of ΔABC, the measure of an exterior angle at C is 105 and $m\angle A = 35$. Find $m\angle B$.

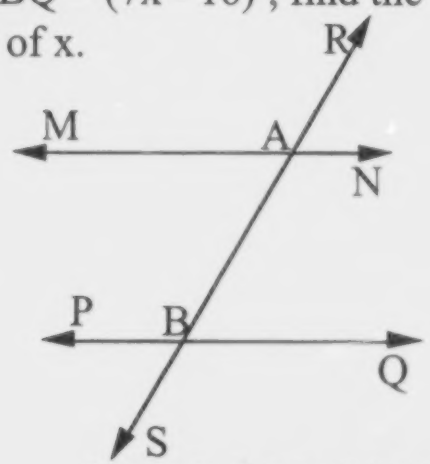


If ΔADE and ΔABC shown in the figure are similar, what is the approximate value of x?

(a) 4.9
(b) 6.1
(c) 9.2
(d) 11.5



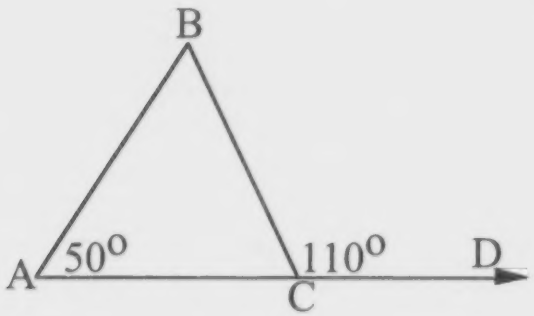
In the diagram, transversal $\overleftrightarrow{RS}$ intersects parallel lines $\overleftrightarrow{MN}$ and $\overleftrightarrow{PQ}$ at A and B, respectively.
If $m\angle RAN = (3x + 24)°$ and $m\angle RBQ = (7x - 16)°$, find the value of x.



Two angles are supplementary. If one angle measures twice the other, find the number of degrees in the smaller angle.

55

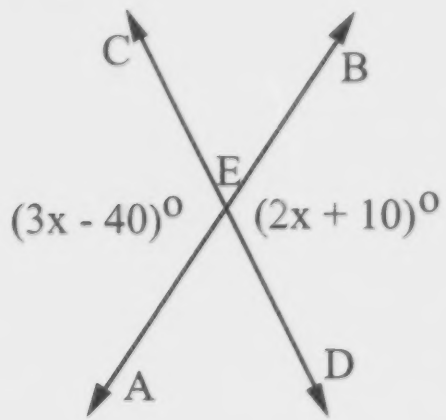
In the accompanying diagram of ΔABC, the measure of exterior angle BCD is 110 and $m\angle BAC = 50$. Find $m\angle ABC$.



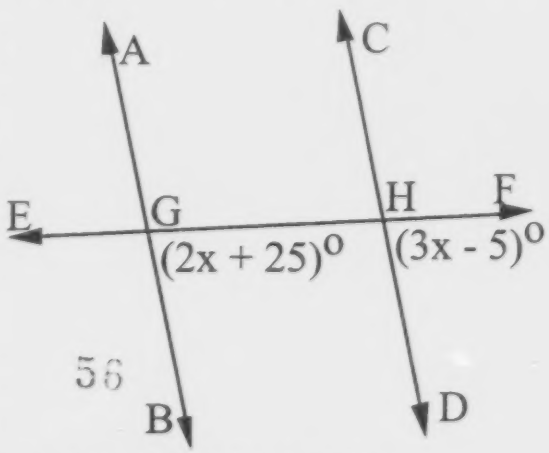
The measure of an angle is represented by x. The measure of the complement of this angle can be represented as

(a) $(90 - x)^\circ$
(b) $(x - 90)^\circ$
(c) $(180 - x)^\circ$
(d) $(x - 180)^\circ$

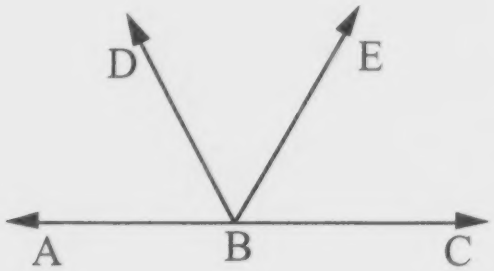
In the diagram $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersect at E.
If $m\angle AEC = 3x - 40$ and $m\angle BED = 2x + 10$, find the value of x.



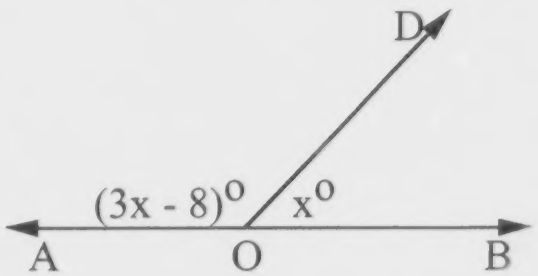
In the diagram, parallel lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are intersected by transversal $\overleftrightarrow{EF}$ at points G and H, respectively. If $m\angle FGB = 2x + 25$ and $m\angle FHD = 3x - 5$, find x.



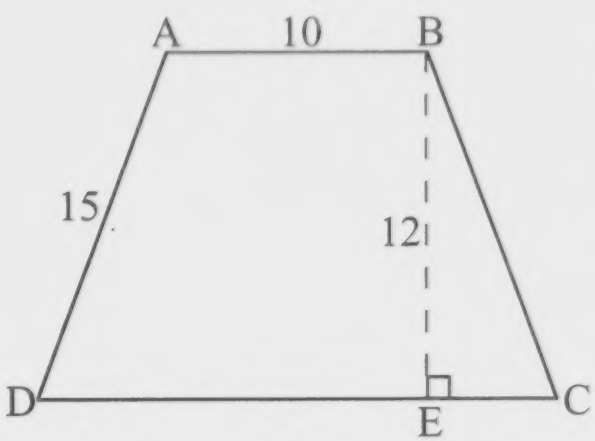
In the diagram, $\overleftrightarrow{ABC}$ is a straight line and $\overrightarrow{BE}$ bisects $\angle DBC$.
If $m\angle ABD = (2x)^\circ$ and $m\angle DBE = (2x + 15)^\circ$, find x.



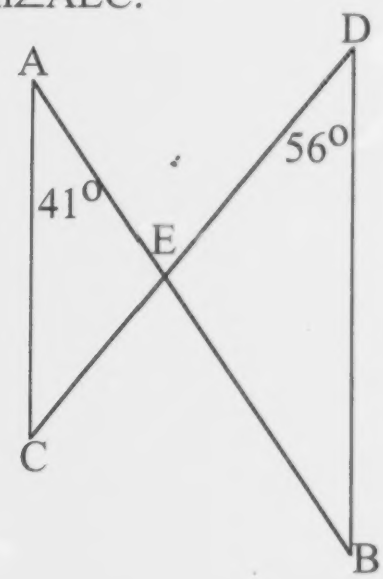
In the diagram, $\overleftrightarrow{AOB}$ is a straight line, $m\angle AOD = 3x - 8$, and $m\angle BOD = x$. Find x.



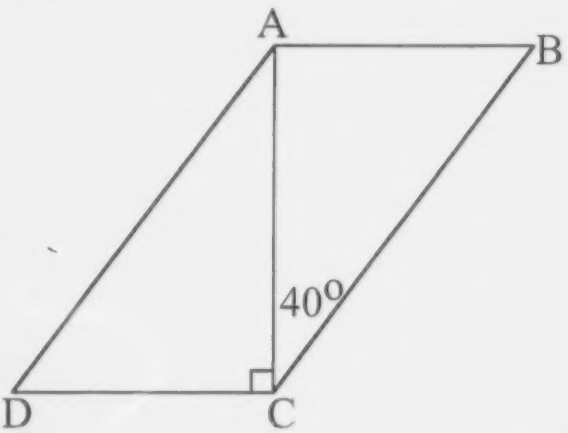
In the diagram, ABCD is an isoceles trapezoid with altitude $\overline{BE}$, AB = 10, AD = 15, and BE = 12.
Find EC.
Find the area of ΔBEC, trapezoid ABCD, and trapezoid ABED.
If diagonal $\overline{DB}$ is drawn, find the area of ΔABD.



In the diagram, $\overline{AB}$ and $\overline{CD}$ intersect at E, $\overline{AC}$ is parallel to $\overline{DB}$, $m\angle A = 41$, and $m\angle D = 56$. Find $m\angle AEC$.



In parallelogram ABCD, diagonal $\overline{AC}$ is perpendicular to $\overline{CD}$. If $m\angle ACD = 40$, find $m\angle ADC$.

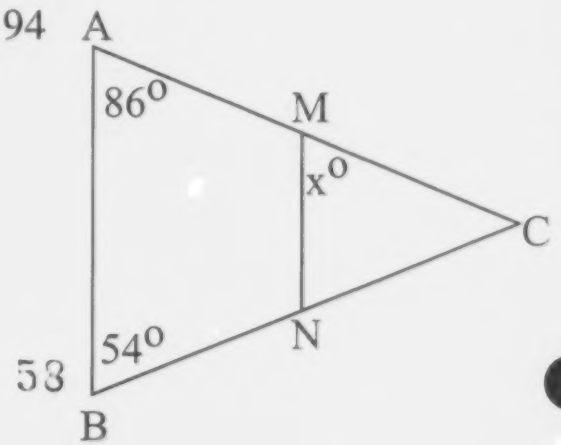


Which of these line segments are parallel?

(a) Two adjacent sides of a triangle
(b) Two adjacent sides of a pentagon
(c) Two opposite sides of a rectangle
(d) Two radii of a circle

Find the value of x if $\overline{AB}$ is parallel to $\overline{MN}$.

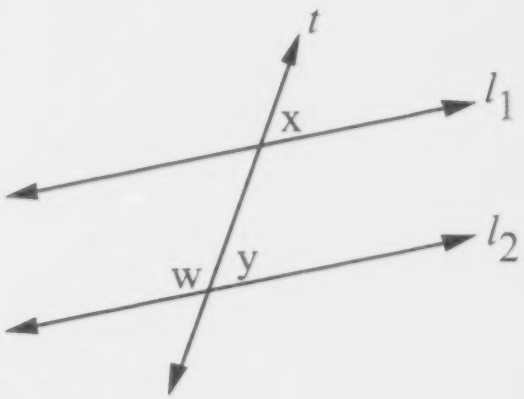
(a) 40
(b) 54
(c) 86
(d) 94



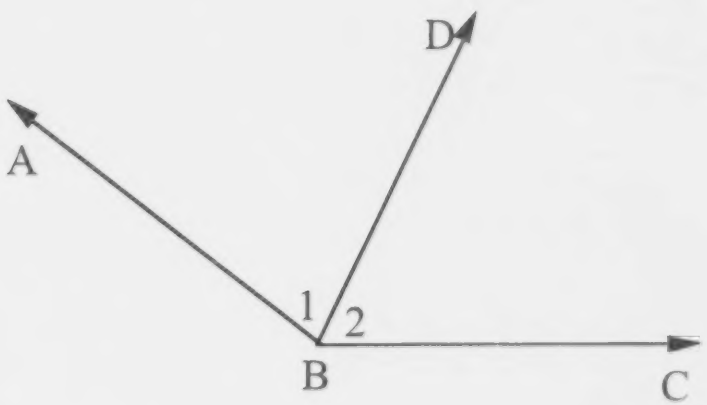
53

Line l_1, is parallel to line l_2 and line t intersects them as shown. If line t were moved so the measure of Δy became larger, then which of the following statements would be true?

(a) $\angle w$ would not change
(b) $\angle w$ would become larger
(c) $\angle x$ would become larger
(d) $\angle x$ would not change

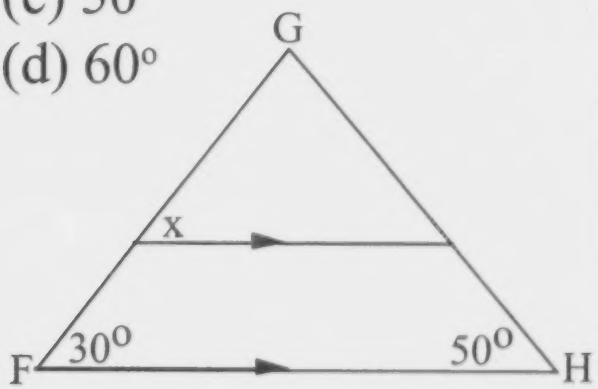


$\overrightarrow{BD}$ bisects $\angle ABC$. If $m\angle 1 = (4x + 19)^\circ$ and $m\angle 2 = (x + 58)^\circ$, find $m\angle ABC$.



In ΔFGH, what is the value of x?

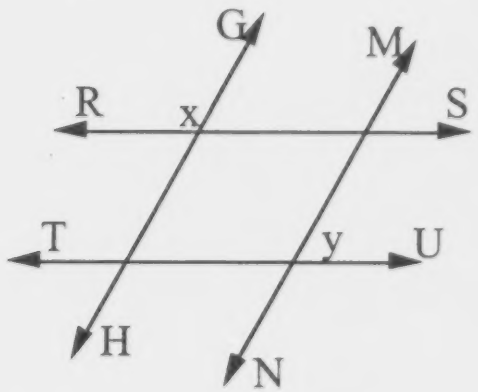
(a) 30°
(b) 40°
(c) 50°
(d) 60°



Which of these line segments are never parallel?

(a) Two sides of a triangle
(b) Two sides of a pentagon
(c) Two sides of a rectangle
(d) Two sides of an octagon?

In the diagram, $\overleftrightarrow{RS}$ is parallel to $\overleftrightarrow{TU}$ and $\overleftrightarrow{GH}$ is parallel to $\overleftrightarrow{MN}$. If $m\angle x = 115°$, find $m\angle y$.

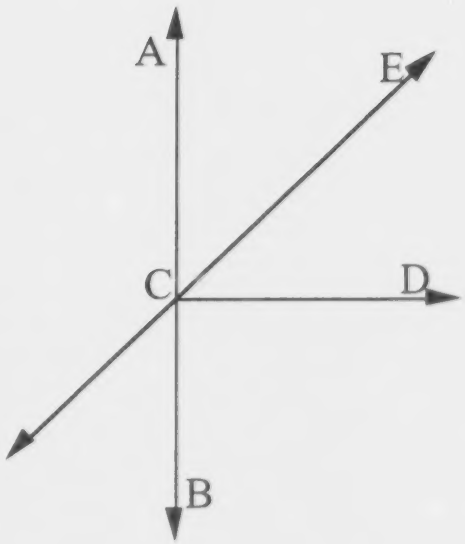


Two parallel lines are cut by a transversal. Two interior angles on the same side of the transversal are represented by $(2x)°$ and $(30 + x)°$. What is the measure of the smaller angle?

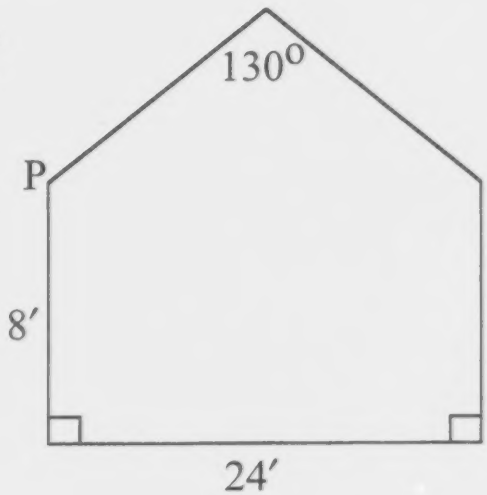
60

In the diagram $\overleftrightarrow{AB}$ intersects $\overleftrightarrow{CE}$ and $\overrightarrow{CD}$ is perpendicular to $\overleftrightarrow{AB}$. Which statement is true?

(a) $\angle ACE \cong \angle BCD$
(b) B, C, and D are collinear
(c) $\angle ACE$ and $\angle ECD$ are complementary
(d) $\angle ACE$ and $\angle$ ECD are supplementary

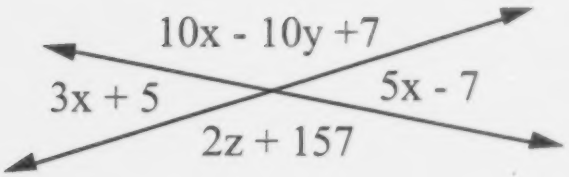


John must put molding around the edges of the walls of the family room. The back wall of the room is shown. At location P, the two pieces must form what angle?

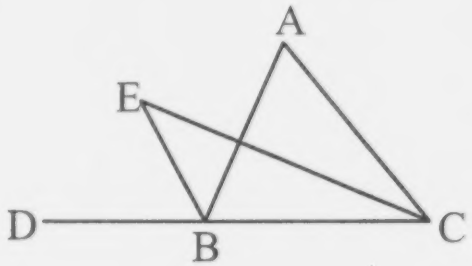


(a) 115°
(b) 90°
(c) 50°
(d) 25°

Find the values of x, y, and z if the degree measures of the angles are as shown.

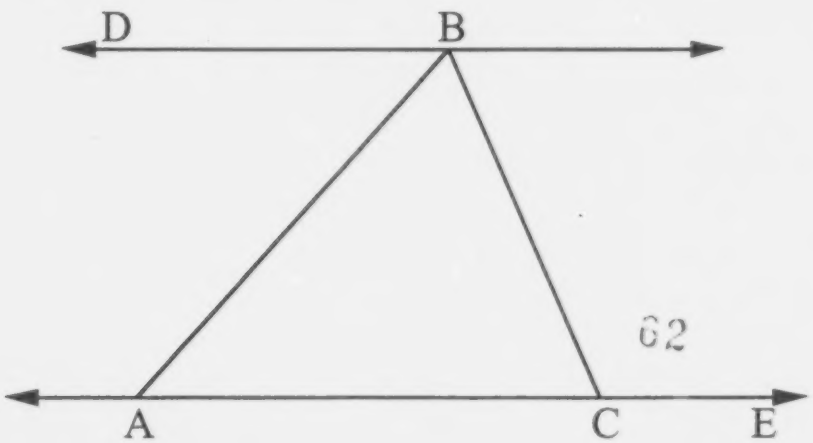


$\overline{CE}$ bisects $\angle ACB$, $\overline{BE}$ bisects $\angle ABD$, and $m\angle A = 80^\circ$. Find $m\angle E$.



In the diagram, $\overleftrightarrow{ACE}$ is parallel to $\overleftrightarrow{DB}$, $m\angle DBA = 40^\circ$, and $m\angle BCE = 105^\circ$. Which statement is true?

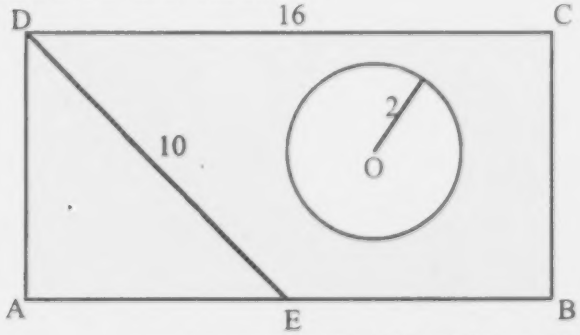
(a) $\overline{AB}$ is the longest side of ΔABC
(b) $\overline{AC}$ is the longest side of ΔABC
(c) ΔABC is an isosceles triangle
(d) ΔABC is an obtuse triangle



Find the area of a right triangle whose legs have lengths 6 and 8.

The length of a rectangle is four more than one-half the width of the rectangle. If the perimeter of the rectangle is 50, find the area of the rectangle and the length of a diagonal of the rectangle.

In the diagram, ABCD is a rectangle, E is the midpoint of $\overline{AB}$, DC = 16, ED = 10, and the radius of Circle O is 2. Find, to the nearest tenth, the area of the shaded region. To the nearest whole percent, what percent of the area of the rectangle is the area of the circle?



The length of a side of an equilateral triangle is represented by 2x - 1. If the perimeter of the triangle is 26.4, what is the value of x?

63

The circumference of a circle is 83 meters. What is the radius of the circle?

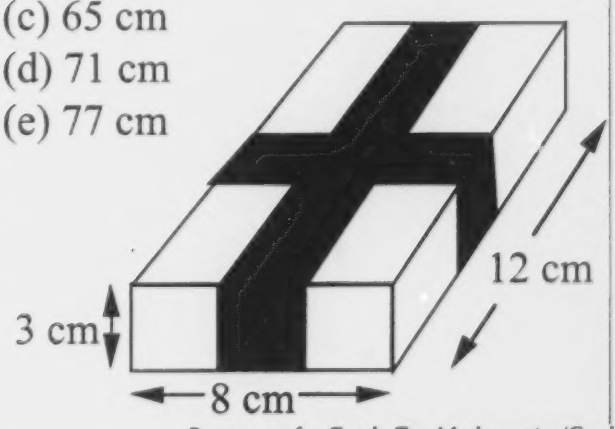
(a) 5.14 m
(b) 10.28 m
(c) 13.21 m
(d) 41.5 m

A side of a square is represented by x - 3. Which expression represents the area of the square?

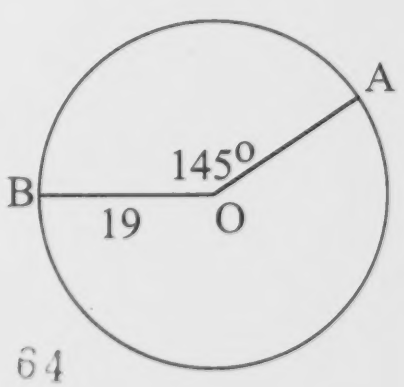
(a) $4x - 12$
(b) $x^2 + 9$
(c) $x^2 - 6x + 9$
(d) $x^2 - 9$

Stu wants to wrap some ribbon around a box as shown below and have 25 centimeters left to tie a bow. How long a piece of ribbon does he need?

(a) 46 cm
(b) 52 cm
(c) 65 cm
(d) 71 cm
(e) 77 cm



What is the length of minor arc AB if the $m\angle AOB$ is 145° and the radius of the circle is 19?



64

If the length of any rectangle is increased by 2 and the width is unchanged, the perimeter is

(a) increased by 2
(b) multiplied by 2
(c) increased by 4
(d) multiplied by 4

The length of a rectangle is 1.6 meters and its perimeter is 5.7 meters. What is the area of the rectangle in square centimeters?

The area of a circle is 50.3 m^2. What is the length of the diameter of the circle?

(a) 16 m
(b) 8 m
(c) 5.7 m
(d) 4 m

If each side of a square is doubled, the area of the square

(a) remains the same
(b) is divided by 2
(c) is doubled
(d) is multiplied by 4

The number of feet in c inches is

(a) $\frac{c}{12}$ (b) $\frac{c}{36}$

(c) $\frac{12}{c}$ (d) 12c

Find the area of the triangle whose vertices have coordinates (8, 0), (0, 10), and (0, 0).

The perimeter of a square is 8a. What is the area of the square?

(a) $4a^2$
(b) $8a^2$
(c) 64
(d) 8

If the radius of a circle is doubled, then the circumference of the circle is multiplied by

(a) 0.5
(b) 2
(c) 16
(d) 4

66

In a triangle, the lengths of the sides are 3, 7, and 8. If the perimeter of a similar triangle is 54, what is the length of the longest side of the larger triangle?

If the ratio of the edges of two cubes is 2:3, the ratio of the two volumes is

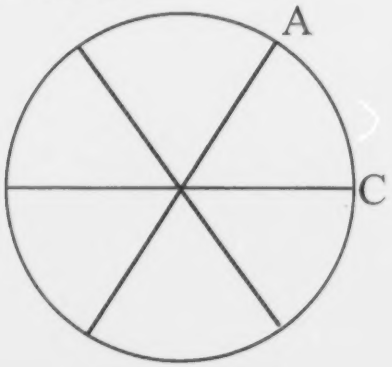
(a) 2:3
(b) 4:9
(c) 8:27
(d) 2:5

The area of a trapezoid is 42 and the lengths of the bases are 6 and 8. Find the length of the altitude of the trapezoid.

What is the area of a triangle whose vertices are A(4, 4), B(8, 3), and C(5, 8)?

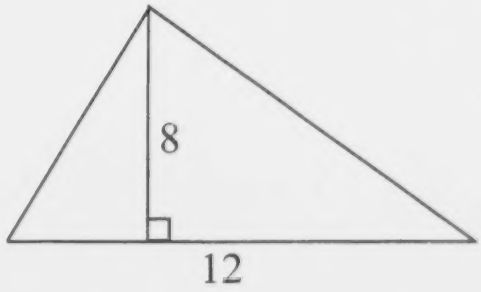
The circle has area 50.3 in^2 and is divided into six congruent sectors. Find the length of arc AC.

(a) 4.2 inches
(b) 8.4 inches
(c) 12.6 inches
(d) 25.1 inches



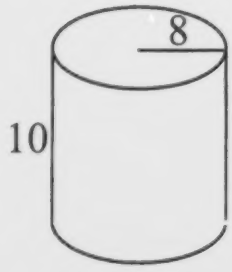
There is a figure similar to the one shown that has a base of 20. What is the area of the other figure?

(a) 160 $units^2$
(b) 80 $units^2$
(c) 133 $units^2$
(d) 96 $units^2$



If the height of the cylinder shown is decreased by 3.5 units, by what percent has the surface area been reduced?

(a) 19%
(b) 65%
(c) 81%
(d) 35%



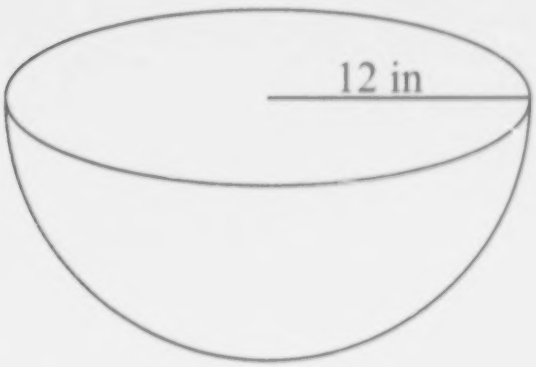
ΔABC is equilateral and has an area of 20 $units^2$. ΔDEF has sides three times as long as those in ΔABC. Find the area of ΔDEF.

(a) 40 $units^2$
(b) 60 $units^2$
(c) 120 $units^2$
(d) 180 $units^2$

63

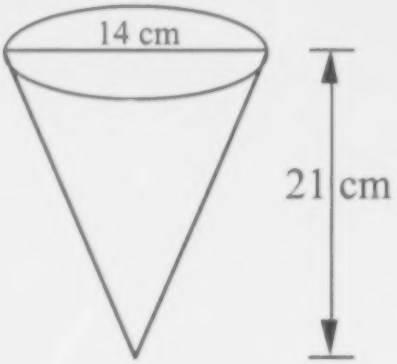
Find the surface area of the hemisphere shown.

(a) 151 in^2
(b) 452 in^2
(c) 905 in^2
(d) 1357 in^2



If the diameter of the cone shown is decreased by 2.5 cm, the volume of the new cone is what percent of the original?

(a) 82%
(b) 67%
(c) 41%
(d) 18%

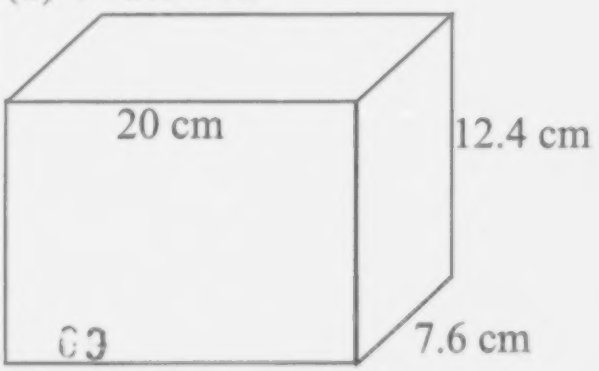


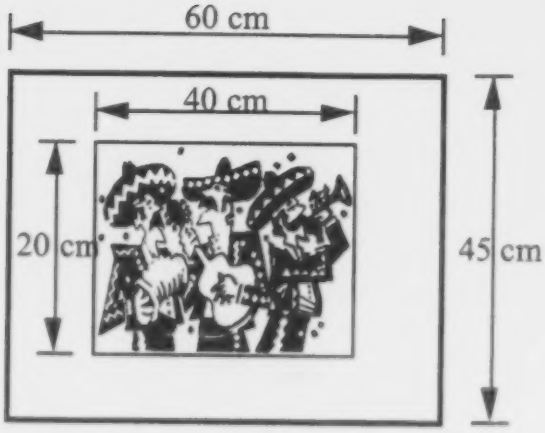
A rectangular enclosure is made with 120 ft of fencing on three sides. The fourth side is the wall of the barn. Find the greatest possible area of such an enclosure.

(a) 900 ft^2
(b) 1400 ft^2
(c) 1800 ft^2
(d) 2100 ft^2

The box shown is being filled with sand. What are the dimensions of a box that could hold 75% of the sand which filled the box shown?

(a) 3.1 • 7.6 • 15
(b) 15 • 9.3 • 5.7
(c) 7.6 • 12.4 • 16
(d) 4 • 5.7 • 62



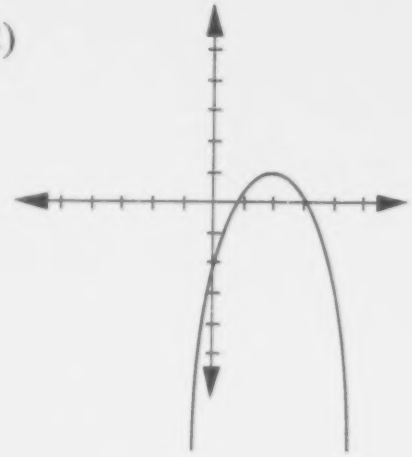


What is the area of the white paper not covered by the picture?

(a) 165 cm^2
(b) 500 cm^2
(c) 1900 cm^2
(d) 2700 cm^2

What is the maximum point on the graph?

(a) (5, 0)
(b) (2, 1)
(c) (3, 0)
(d) (0, -2)



A baseball has a radius of 7 cm. What is its approximate surface area?

(a) 308 cm^2
(b) 616 cm^2
(c) 808 cm^2
(d) 1437 cm^2

A rectangle with a perimeter of 24 inches might have adjacent sides measuring

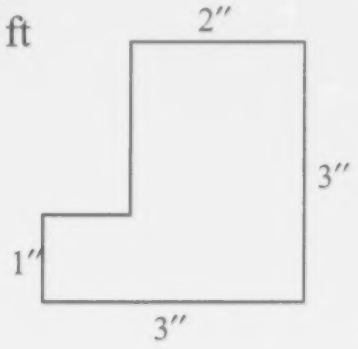
(a) 6 inches and 4 inches
(b) 11 inches and 13 inches
(c) 9 inches and 3 inches
(d) 2 inches and 12 inches

The volume of a sphere is 905 in^3. Find the radius of the sphere.

(a) 6 in
(b) 7.34 in
(c) 12
(d) 14.7 in

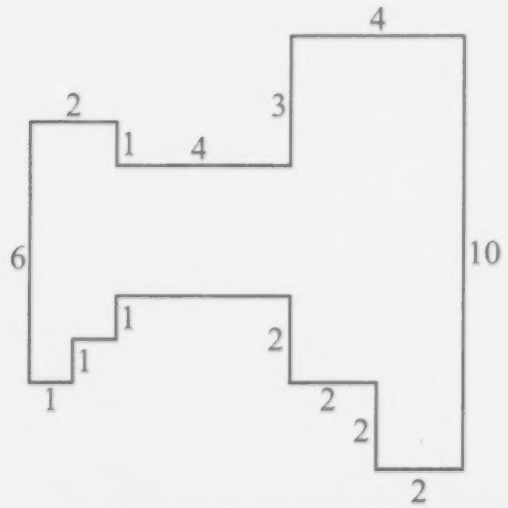
If the scale on the plans for the new music store reads 1 inch = 75 feet, what will be the perimeter of the new store?

(a) 300 ft
(b) 675 ft
(c) 900 ft
(d) 2700 ft



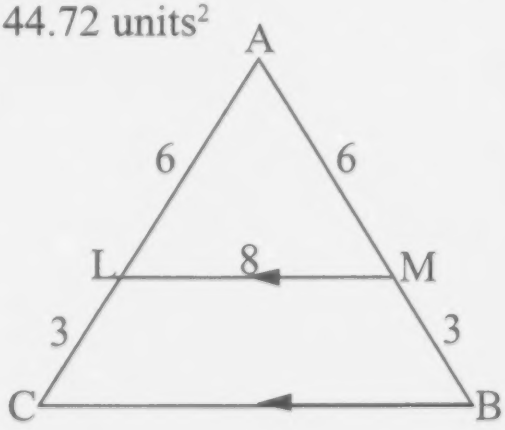
The scale diagram shows the open space at the mall. What is the area of the open space?

(a) 41 $units^2$ (b) 45 $units^2$
(c) 55 $units^2$ (d) 59 $units^2$



Determine the area of trapezoid MBCL.

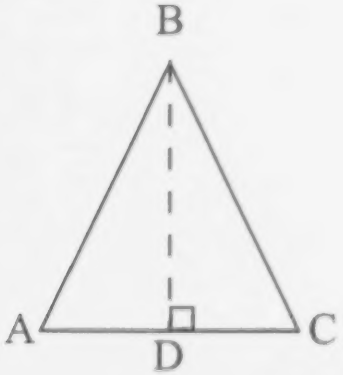
(a) 17.89 $units^2$
(b) 22.36 $units^2$
(c) 40.25 $units^2$
(d) 44.72 $units^2$



Find the number of square units in the area of a triangle whose vertices are A(2, 0), B(6, 3), and C(4, 5).

The sides of ΔABC are 6.8, 6.8, and 8.4 meters. Find the perimeter of the triangle that is formed by joining the midpoints of the sides of ΔABC.

In the diagram of isosceles triangle ABC, AB = CB and altitude BD is two more than AD. The area of ΔABC is 10. Find the length of $\overline{AD}$. Find the length of AB.



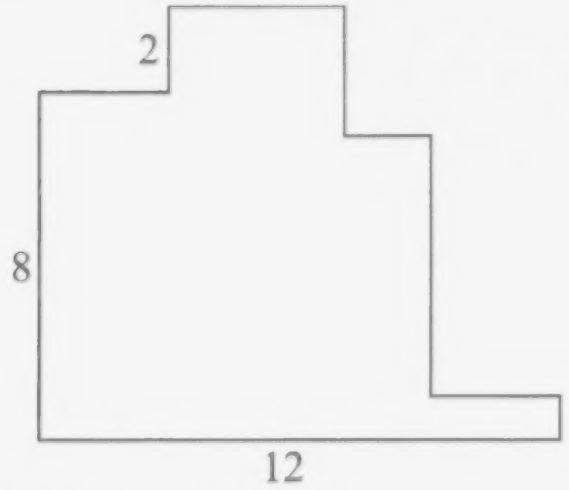
In equilateral triangle ABC, AB = 3x and BC = 2x + 12. Find the numerical value of the perimeter of ΔABC.

72

A hollow piece of cylindrical pipe has an outside radius of 5.6 inches and an inside radius of 5.3 inches. The pipe is six feet long. To the nearest tenth, how many square inches are in the total surface area of the pipe?

Find the number of square units in the area of a triangle whose vertices are A(2, 0), B(6, 0), and C(4, 5).

The adjacent sides of the decagon meet at right angles. What is its perimeter?



What fraction of the square region is shaded? The stripes are equal in width, and the figure is drawn to scale.

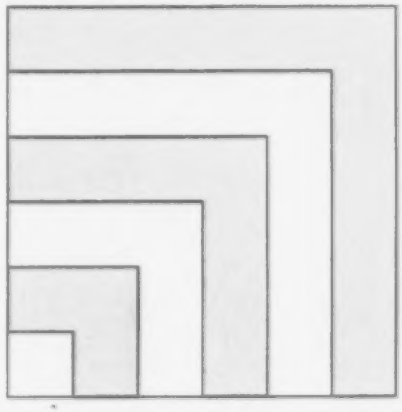
(a) $\frac{5}{12}$

(b) $\frac{1}{2}$

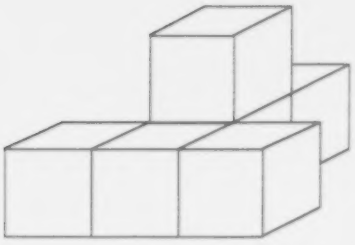
(c) $\frac{7}{12}$

(d) $\frac{2}{3}$

(e) $\frac{5}{6}$

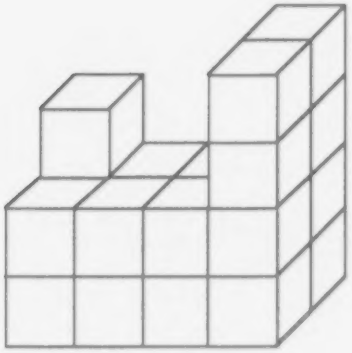


Find the surface area of the figure if each cube has an edge 3.6 cm in length.

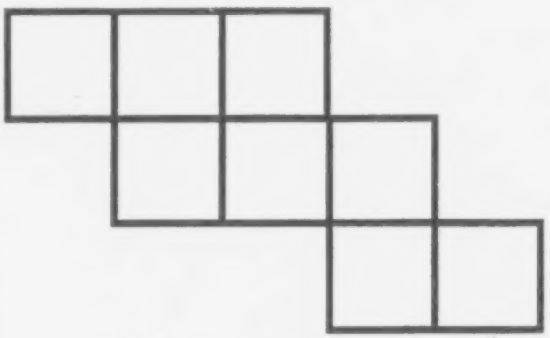


The areas of the sides of a box are 42, 54, and 63 cm^2. What is the volume of the box?

This figure is built with cubes. The bottom, horizontal edge of the figure is 14 cm long. What is the volume of the figure? What is its surface area?

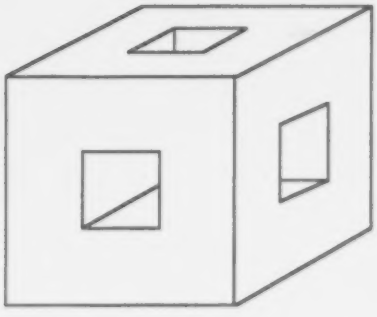


The area of the figure, made with eight congruent squares, is 2312 cm^2. What is the perimeter of this figure?



74

The plastic cube shown originally had a volume of 1500 cm^3. The front face is drawn to proportion. Square holes were cut through to the opposite face. What is the volume of the remaining plastic?



What is the rectangle of greatest area having a perimeter of 38 centimeters and sides of integral measure?

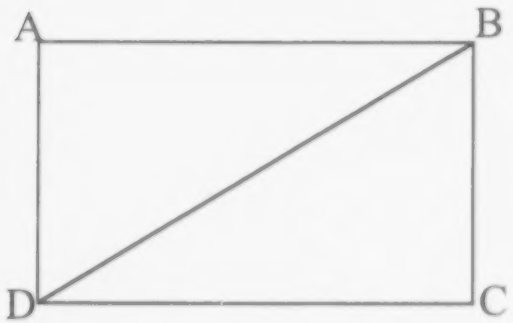
A large cube has surface area of 486 cm^2. Is the total surface area of two smaller cubes whose edges are half as long as those of the larger cube (a) less than, (b) equal to, or (c) greater than the surface area of the larger cube? Why?

A square piece of paper is folded in half vertically. If the resulting figure has a perimeter of 12 centimeters, what was the area of the original square?

The length of the hypotenuse of a right triangle is 15 and the length of one leg is 12. Find the length of the other leg.

The dimensions of a rectangle are 7 centimeters by 24 centimeters. Find, in centimeters, the length of the diagonal of this rectangle.

In the diagram, ABCD is a rectangle. If DB = 26 and DC = 24, find BC.



In a right triangle, the length of the hypotenuse is 12 and the length of one leg is 8. What is the length of the other leg?

(a) 14.4
(b) 8.9
(c) 4.5
(d) 4

76

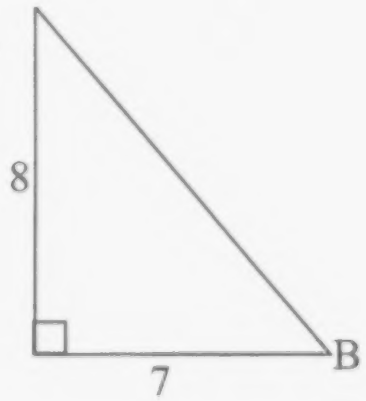
Which set of numbers does not represent the lengths of the sides of a right triangle?

(a) {696, 697, 985}
(b) {333, 644, 725}
(c) {171, 140, 221}
(d) {119, 120, 171}

The lengths of the legs of a right triangle are 49.5 and 147.2. Find the length of the hypotenuse.

What is the m∠B?

a 11°
b 41°
c 49°
d 114°



In a right triangle, the length of the longer leg is two centimeters more than twice the length of the shorter leg. The length of the hypotenuse is eight centimeters more than the length of the shorter leg. Find, in centimeters, the lengths of the three sides of the triangle.

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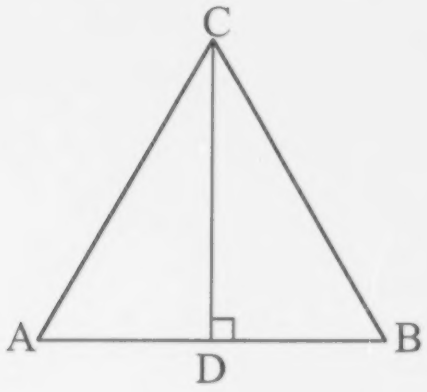
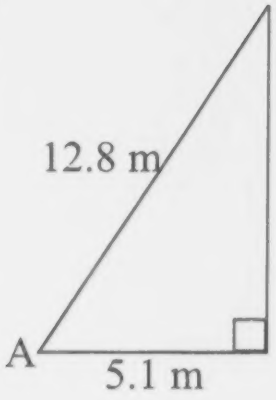
ΔABC is equilateral. If AB = 6.8, find CD.

(a) 5.9
(b) 6.8
(c) 9.6
(d) 11.8



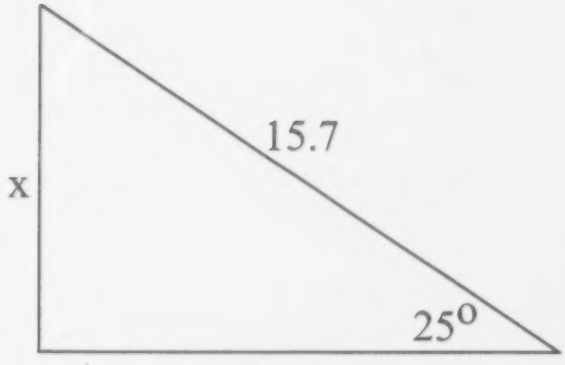
Find sin A.

(a) .398
(b) .917
(c) 2.30
(d) 11.7



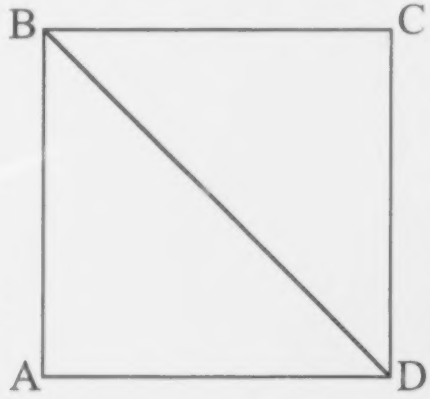
Find the value of x.

a) 4.0
(b) 6.8
(c) 7.3
(d) 14.2



Square ABCD has area $x^2 + 4x + 4$. Find BD.

(a) $(x + 2)^2$
(b) $1.414 \cdot (x + 2)$
(c) $2x^2 + 8x + 8$
(d) $x + 2$



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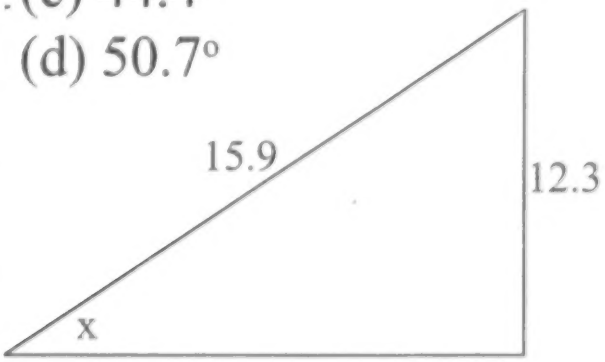
In a right triangle, the legs have lengths 5 and 7. What is the length of the hypotenuse?

Find the measure of angle x.

(a) 37.7°
(b) 39.3°
(c) 44.4°
(d) 50.7°



If cos x = 0.8, what is the value of sin x?

The peak of Scott Mountain is 400 m higher than the local airstrip. The horizontal distance from the end of the runway to a point directly below the mountain peak is 2025 m. A plane takes off at the end of a runway in the direction of the mountain at an angle that is kept constant until the peak has been cleared. If the pilot wants to clear the mountain by 50 m, what should be the angle of takeoff to the nearest degree?

73

What is the length of a diagonal of a rectangle whose sides are 3 and 7?

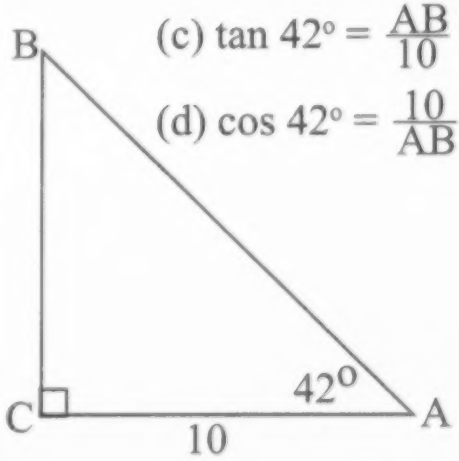
In the diagram, $m\angle C = 90$, $m\angle A = 42$, and $CA = 10$. Which equation can be used to find AB?

(a) $\tan 42^\circ = \frac{10}{AB}$

(b) $\cos 42^\circ = \frac{AB}{10}$

(c) $\tan 42^\circ = \frac{AB}{10}$

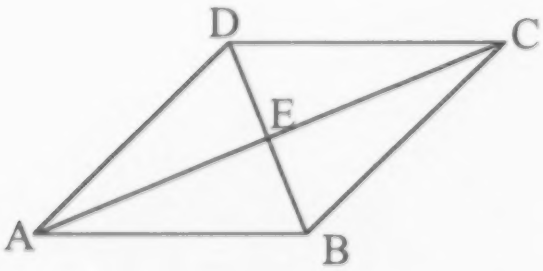
(d) $\cos 42^\circ = \frac{10}{AB}$



In the diagram of rhombus ABCD, $m\angle BAD = 36^\circ$ and the length of diagonal AEC = 16.

Find the length of diagonal $\overline{BD}$.

Find the perimeter of rhombus ABCD.



The hypotenuse of right triangle ABC is 10 and $m\angle A = 60^\circ$. What is the measure, to the nearest tenth, of the leg opposite $\angle A$?

(a) 1
(b) 5.8
(c) 7.1
(d) 8.7

A 20-foot ladder is placed at an angle to a wall that is 16 feet tall. How far from the wall should the ladder be placed in order to just reach the top of the wall?

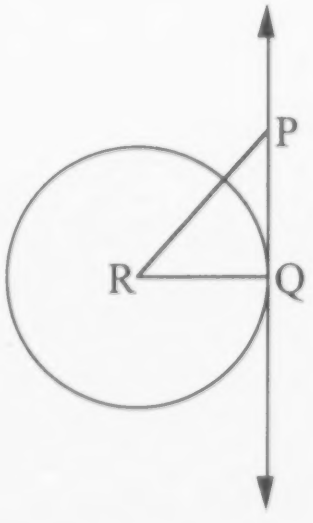
(a) 36 ft
(b) 26 ft
(c) 12 ft
(d) 4 ft

In a rectangle with sides 5 m and 12 m, what is the sum of the lengths of the diagonals?

(a) 13 m
(b) 26 m
(c) 34 m
(d) 52 m

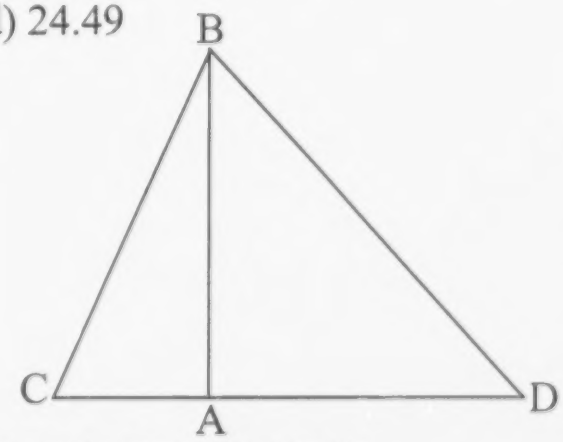
$\overleftrightarrow{PQ}$ is a tangent to circle R at point Q. The circle has a radius of 6. If $m\angle R = 30°$, find RP.

(a) 3.5
(b) 3
(c) 6
(d) 6.9

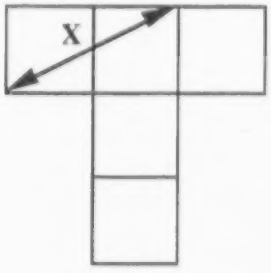


$\overline{BD}$ is perpendicular to $\overline{CD}$. The $m\angle C = 60°$ and the $m\angle D = 45°$. $BC = 10$. Find the length of $\overline{BD}$.

(a) 8.66
(b) 12.25
(c) 14.14
(d) 24.49



Five congruent squares are arranged in a T-shape as shown. If x = 15, then find the area of the T-shaped figure.



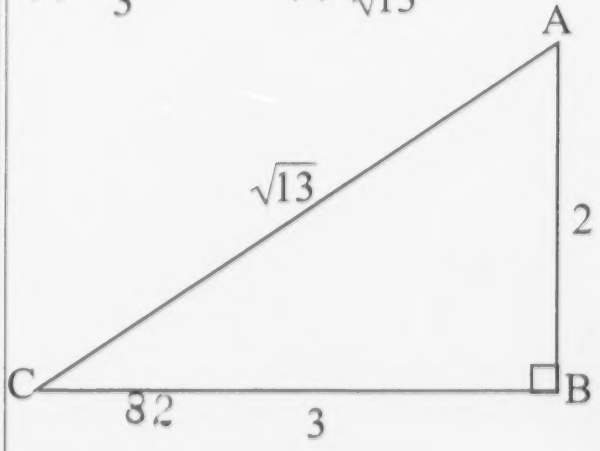
Find the perimeter of a square if the diagonal is 40 units in length.

If two legs of a right triangle measure 3 and $\sqrt{10}$, then the hypotenuse must measure

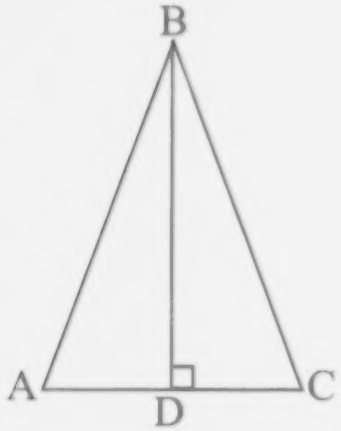
(a) 1
(b) $\sqrt{19}$
(c) 10
(d) 19

In the diagram of right triangle ABC, what is tan C?

(a) $\frac{2}{3}$ (b) $\frac{3}{2}$
(c) $\frac{\sqrt{13}}{3}$ (d) $\frac{2}{\sqrt{13}}$



In the diagram of isosceles triangle ABC, $\overline{BA} \cong \overline{BC}$ and altitude $\overline{BD}$ is drawn. If BD = 4 and AD = 3, find the perimeter of ΔABC.



If tan A = 0.4548, find the measure of $\angle A$ to the nearest tenth degree.

In the diagram of right triangle ABC, AC = 40 centimeters, $m\angle A = 55°$, and $m\angle C = 90°$. Find the length of $\overline{AB}$.

The straight string of a kite makes an angle of elevation from the ground of 60°. The length of the string is 400 feet. What is the best approximation of the height of the kite?

(a) 200 feet
(b) 250 feet
(c) 300 feet
(d) 350 feet

What is the length of the altitude of an equilateral triangle whose side has a length 4?

(a) $2\sqrt{3}$
(b) 2
(c) $4\sqrt{3}$
(d) 4

Following the directions given her, June traveled north 23 miles and then turned west, traveling 19 miles to reach a friend's house. If she could have traveled on a straight line to her friend's, how much shorter would the trip have been?

(a) 29.8 miles
(b) 6.8 miles
(c) 10.8 miles
(d) 12.2 miles

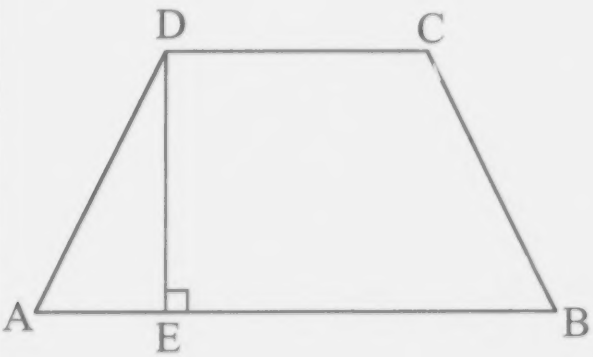
In order to avoid a large oil spill, a fishing vessel was directed by the US Coast Guard to proceed 12 miles south and then travel east 7 miles before resuming their previous course. How many miles out of their way did the vessel travel?

In right triangle ABC, the hypotenuse $\overline{AB}$ is 5, AC = 3, and BC = 4. Sin B is equal to

(a) sin A
(b) cos A
(c) tan A
(d) cos B

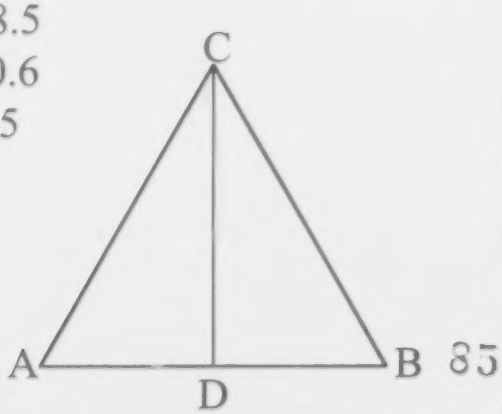
What is the length of a side of a square whose diagonal measures $4\sqrt{2}$?

In the diagram of isosceles trapezoid ABCD, $m\angle A = 53°$, DE = 6, and DC = 10. Find AE to the nearest tenth. Find the perimeter of ABCD to the nearest tenth.



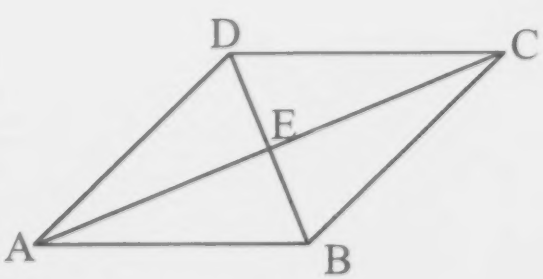
In isosceles triangle ABC, AC = BC = 20, $m\angle A = 68°$, and $\overline{CD}$ is the altitude to side $\overline{AB}$. What is the length of $\overline{CD}$ to the nearest tenth?

(a) 49.5
(b) 18.5
(c) 10.6
(d) 7.5



85

In the diagram of rhombus ABCD, $m\angle CAB = 25°$ and AC = 18. Find, to the nearest tenth, the perimeter of ABCD and the length of $\overline{BD}$.



A rotation of a figure can be considered

(a) a turning of the figure about some fixed point
(b) a slide of the figure
(c) an enlargement or a reduction of the figure
(d) a mirror image of the figure

Under which transformation can the image be a different size than the original figure?

(a) translation
(b) rotation
(c) dilation
(d) reflection

$\Delta A'B'C'$ is the image of ΔABC under a dilation such that $A'B' = 0.5AB$.
ΔABC and $\Delta A'B'C'$ are

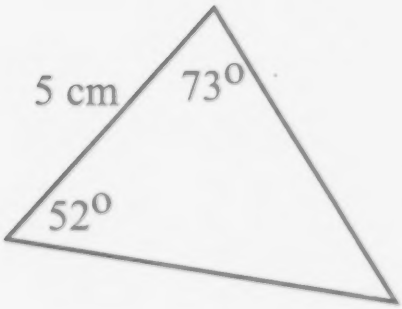
(a) congruent but not similar
(b) similar but not congruent
(c) both congruent and similar
(d) neither congruent nor similar

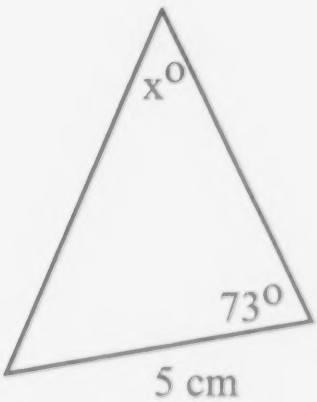
The best description of a dilation of a figure is

(a) an enlargement or reduction of the figure
(b) a slide of the figure
(c) a turning of the figure about some fixed point
(d) a mirror image of the figure

These triangles are congruent. The measures of some of the sides and angles of the triangles are shown. What is the value of x?

(a) 52
(b) 55
(c) 65
(d) 73
(e) 75

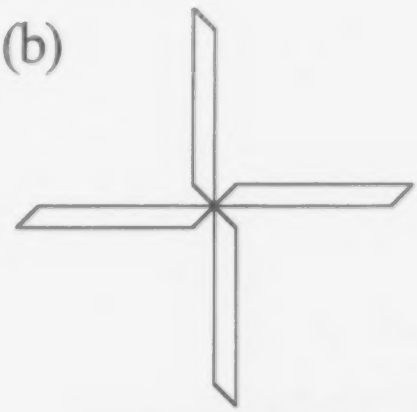




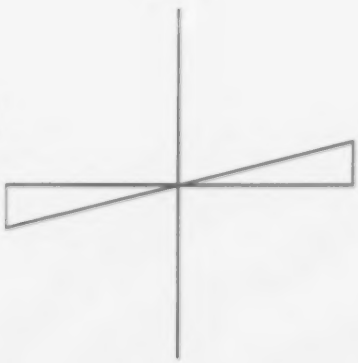
Which of the figures illustrates 90° rotational symmetry?

(a)

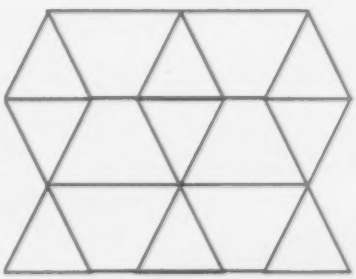
(b)



(c)



(d)



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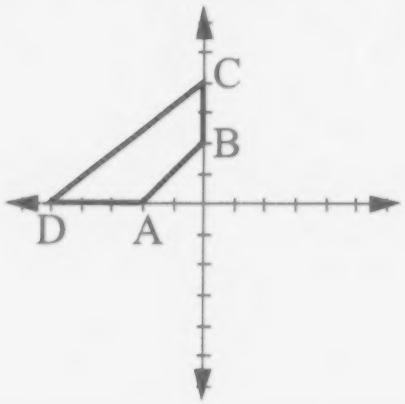
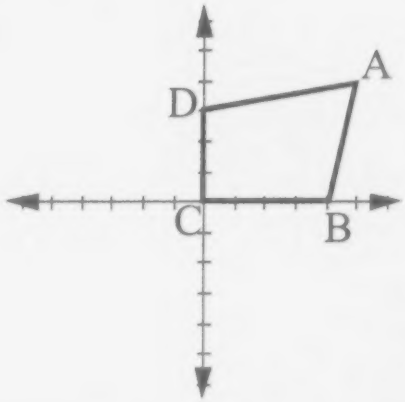
If ABCD is reflected across the y-axis and translated 3 units to the right, what will be the new coordinates for B?



If ABCD is rotated 90° clockwise about the origin, what will be the new coordinates of point A?



If a translation maps point A(-3, 1) to point A′(5, 5), the translation can be represented by

(a) (x + 8, y + 4)
(b) (x + 8, y + 6)
(c) (x + 2, y + 6)
(d) (x + 2, y + 4)

What are the coordinates of A′, the image of point A(-5, 1) after a reflection across the y-axis?

83

Point (2, 5) is reflected across the x-axis. What is the image of the point after reflection?

(a) (2, -5)
(b) (-2, 5)
(c) (-2, -5)
(d) (5, 2)

Under a dilation with constant of dilation k, the image of the point (2, 3) is (8, 12). What is the value of k?

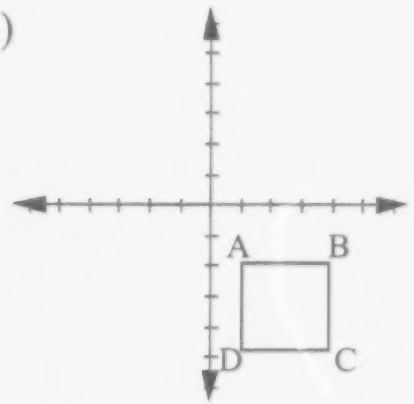
Right triangle ABC is located in the coordinate plane at A(2, 3), B(8, 3), and C(8,9). If ΔABC is rotated 90° counterclockwise about the origin, where is the image of vertex B located?

(a) (-3, 2)
(b) (-3, 8)
(c) (2, -3)
(d) (-9, 8)

What are the coordinates of N′, the image of N(5, -3) under a reflection across the y-axis?

ABCD is a square. What will be the coordinates of point A if the square is translated 3 units left?

(a) (1, -2)
(b) (-2, -2)
(c) (2, -2)
(d) (4, -2)



The endpoints of $\overline{AB}$ are A(1, 4) and B(5, 1). On graph paper draw and label $\overline{AB}$. Graph and state the coordinates of $\overline{A'B'}$, the image of $\overline{AB}$ after it is reflected across the y-axis.

Under a translation, the image of point (3, 2) is (-1, 3). What are the coordinates of the image of point (-2, 6) under the same translation?

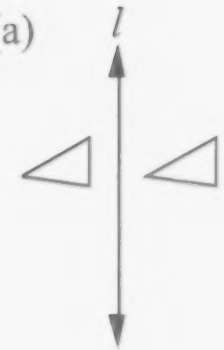
What is the reflection of the point (-3, 8) with respect to the line $y = 3$?

(a) (9, 8)
(b) (3, 8)
(c) (-3, -2)
(d) (-3, -8)

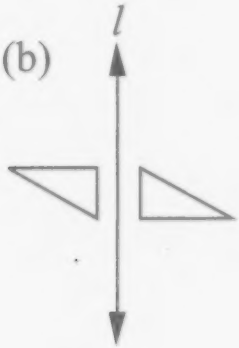
90

Which diagram represents a reflection across line l?

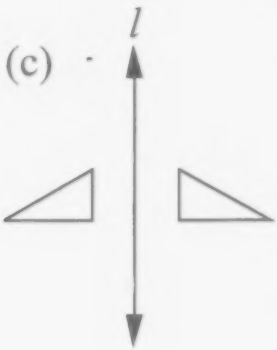
(a)



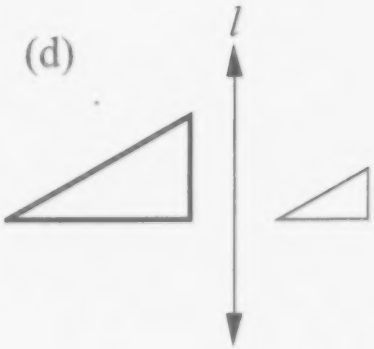
(b)



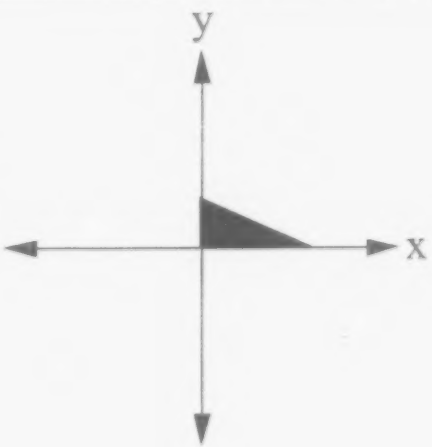
(c)



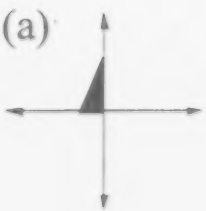
(d)



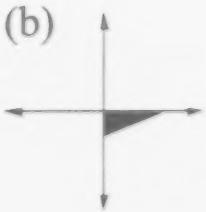
The diagram to the right shows a right triangle. If the triangle is rotated 90° counterclockwise about the origin, what will the image be?



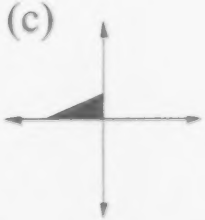
(a)



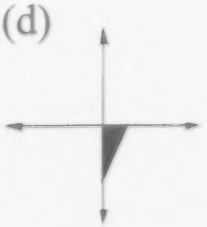
(b)



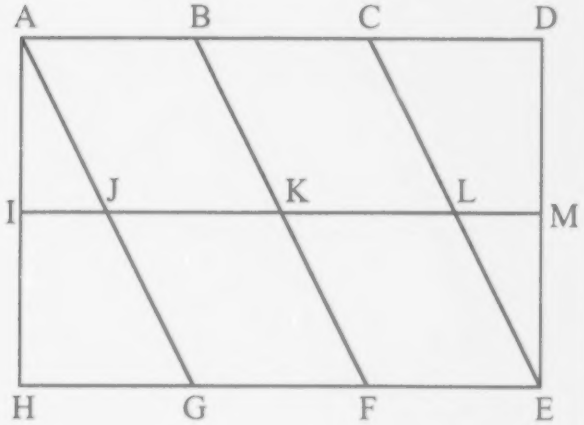
(c)



(d)

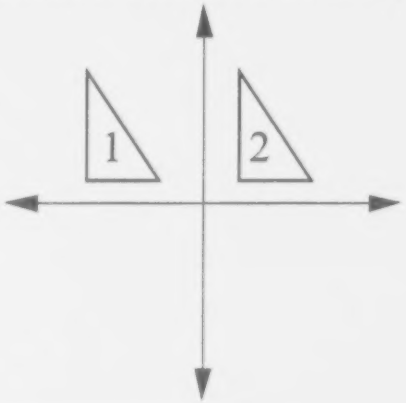


In the diagram, K is the image of A after a translation. Under the same translation, which point is the image of J?

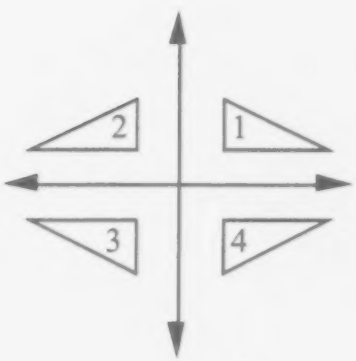


In the diagram, which transformation makes triangle 2 the image of triangle 1?

(a) reflection across the y-axis
(b) dilation
(c) translation
(d) rotation centered at the origin

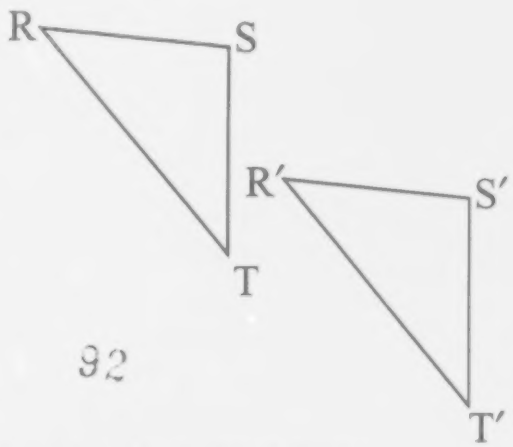


In the diagram, which triangle is the image of Δ2 after a reflection across the x-axis?



In the diagram, $\Delta R'S'T'$ is the image of ΔRST. Which type of transformation is shown in the diagram?

(a) dilation (b) reflection
(c) rotation (d) translation



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Grade 10 Mathematics

Goal 3: This strand will focus on using the language of algebra to express numerical, geometric and problem-based relationships and solve related problems and modeling, graphing and exploring data sets and functions including those involving linear, quadratic and exponential relations and solve related problems.

3.01 The learner will use the language of algebra and formulas to solve problems.	pp. 88 - 97
3.02 The learner will demonstrate an understanding of relations and functions.	pp. 98 - 107
3.03 The learner will graph and use linear equations and inequalities.	pp. 108 - 124
3.04 The learner will solve problems that involve nonlinear equations.	pp. 125 - 134
3.05 The learner will use an appropriate method to solve problems involving systems of equations and inequalities.	pp. 135 - 144
3.06 The learner will perform operations with polynomials.	pp. 145 - 156

If $p = 2ak^2$, find p when $a = -1$ and $k = 3$

Which sentence illustrates the commutative property for addition?

(a) $(a + b) + c = a + (b + c)$
(b) $a(b + c) = ab + ac$
(c) $a + 0 = a$
(d) $a + b = b + a$

Expressed in terms of d, the number of weeks in d days is

(a) $\frac{d}{7}$
(b) $\frac{7}{d}$
(c) $7d$
(d) $7 + d$

Using the letter n to represent a number, express "four less than twice this number" in terms of n.

94

Given the formula $t = rv^2$, find t if $r = 3$ and $v = -2$.

If four boxes of raisins cost x quarters, what is the cost, in cents, of one box?

(a) $\frac{25x}{4}$

(b) $\frac{4}{25x}$

(c) $\frac{x}{4}$

(d) $4x$

Find three positive consecutive odd integers such that the square of the middle integer increased by four times the largest integer is 173.

The larger of two numbers is 24 less than the square of the smaller. If the larger number is divided by the smaller, the quotient is -5. Find the larger of the two numbers.

95

Which of the following ordered pairs (x, y) is a solution to the equation $2x - 3y = 6$?

(a) (6, 3)
(b) (3, 0)
(c) (3, 2)
(d) (2, 3)
(e) (0, 3)

Juan has 5 fewer hats than Maria, and Clarissa has 3 times as many hats as Juan. If Maria has n hats, which of these represents the number of hats that Clarissa has?

(a) 5 - 3n
(b) 3n
(c) n - 5
(d) 3n - 5
(e) 3(n - 5)

If (n + 4) represents a positive odd integer, the next larger consecutive positive odd integer is represented by

(a) 2(n + 4)
(b) n + 2
(c) n + 5
(d) n + 6

If 18 is subtracted from twice the square of an integer, the result is equal to nine times the integer. Find the integer.

If 3 is added to twice the square of an integer, the result is equal to seven times the integer. Find the integer.

The base of a triangle is 4 units more than the height. The area of the triangle is 48 square units. if the height is represented by x, which equation could be used to find the measure of the height of the triangle?

(a) $x(x + 4) = 48$
(b) $0.5x(x + 4) = 48$
(c) $0.5(2x + 4) = 48$
(d) $0.5x(x - 4) = 48$

There are two pairs of integers that satisfy both of these conditions:

The larger integer is nine more than the smaller integer.
The sum of the squares of the integers is 41.

Find the two pairs of integers and show that they both satisfy the stated conditions.

Find the value of $a^2 - b$ if $a = 3$ and $b = -4$

Evaluate the following expression using $x = 2$, $y = 0$, and $z = -3$.

$$xz + (xy - z)$$

(a) -9
(b) -3
(c) 3
(d) 9

Anne has 2 part time jobs, babysitting and store clerk. She makes 1.5 times as much money as a clerk than babysitting. She earned $25.50 last week. Which equation represents this relationship?

(a) $1.5c - b = 25.5$
(b) $1.5b + c = 25.5$
(c) $1.5b - c = 25.5$
(d) $1.5c + b = 25.5$

Charlie traveled from his home to Greensboro at an average speed of 57 miles per hour. The trip took him 1 hour and 25 minutes. How many miles is it from Charlie's home to Greensboro?

(a) 81
(b) 82
(c) 83
(d) 85

Evaluate $6xy^2 - 5xz$ if $x = 3$, $y = \frac{1}{3}$, and $z = \frac{-1}{2}$.

(a) $\frac{23}{2}$ (b) $\frac{27}{2}$

(c) $\frac{-3}{2}$ (d) $\frac{-15}{2}$

93

Which property is illustrated by $\Diamond(\Delta + O) = \Diamond\Delta + \Diamond O$?

(a) distributive
(b) associative
(c) commutative
(d) transitive

Multiply:
$6(2x - 3y)$.

(a) $8x - 3y$
(b) $8x + 3y$
(c) $12x - 3y$
(d) $12x - 18y$

Evaluate $ac - d$ when $a = -15$, $c = -5$, and $d = -2$.

(a) 77
(b) 73
(c) -77
(d) -153

Mr. McDonald works for a company that pays 32¢ for every mile traveled on company time. How much money should he receive if he travels 155 miles?

(a) $49.60
(b) $484.38
(c) $3,200.00
(d) $4,960.00

When finding a grade point average, an A is worth 4 points, a B is worth 3 points, a C is worth 2 points, a D is worth 1 point, and a F is worth 0. After finding the total number of points, the sum is divided by the number of grades. What is Terri's grade point average if she had 4 As, 3 Bs, 2 Cs, and 1 D?

(a) 30
(b) 10
(c) 3
(d) 2.75

Which of the following algebraic sentences accurately reflects the verbal expression, "twice the sum of a number and seven"?

(a) $2(x + 7)$
(b) $2x + 7$
(c) $2x - 7$
(d) $2(x - 7)$

A soup company decides to increase the height of its cans by 30% but to keep the volume the same. Approximately how much must the radius of the can be decreased to keep the volume constant?

Evaluate $4x^2 - 2x + 10$, when $x = 1.5$.

(a) 12
(b) 13
(c) 14
(d) 16

100

If x represents the smallest of three consecutive odd integers, then the largest would be represented by

(a) $x + 2$
(b) $x + 3$
(c) $x + 4$
(d) $x + 5$

Find the numerical value of $4xy^2$ when $x = \frac{1}{2}$ and $y = -3$.

The measures of the three angles of a triangle are represented by x, 3x, and $x + 30^\circ$.
Find the value of x.

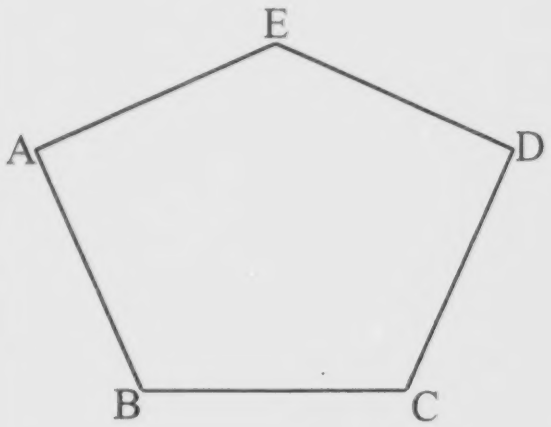
If the sum of a number and four is multiplied by two, the result is 28. What is the number?

101

The sum of two numbers is S. If one of the numbers is N, the second number can be expressed as

(a) S + N
(b) S ÷ N
(c) S - N
(d) N - S

In the diagram, ABCDE is an equilateral pentagon with AB = 2x + 1.
If the perimeter of the pentagon is 54, find the value of x.



The volume of a rectangular solid is 24 cubic centimeters. If the width is two centimeters and the length is three centimeters, what is the height of the solid?

If 5 is added to both the length and the width of a rectangle, then the perimeter is increased by

(a) 5
(b) 10
(c) 20
(d) 25

When $x = 2$ and $y = 0.5$, which expression has the largest value?

(a) $x - y$
(b) $x + y$
(c) $x \div y$
(d) $x \cdot y$

Tickets for a concert were purchased at the rate of 500 tickets in 20 minutes. At this rate, how many tickets were purchased in m minutes?

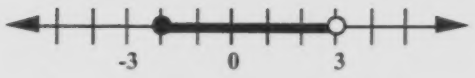
(a) $\frac{1}{25}m$
(b) $25m$
(c) $50m$
(d) $500m$

Find the value of $4x^2 - 2y$ when $x = -2$ and $y = -1$.

Which sentence illustrates the associative property for multiplication?

(a) $ab = ba$
(b) $a(bc) = (ab)c$
(c) $a \cdot 1 = a$
(d) $a(b + c) = ab + ac$

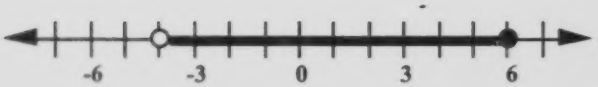
Which inequality is represented by the graph.



(a) $-2 \leq x < 3$
(b) $-2 \leq x \leq 3$
(c) $-2 < x < 3$
(d) $-2 < x \leq 3$

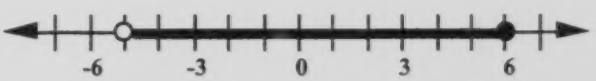
A point whose y-coordinate is 6 lies on the line whose equation is $y = 5x - 4$. What is the x-coordinate of the point?

Which inequality is represented by the graph?



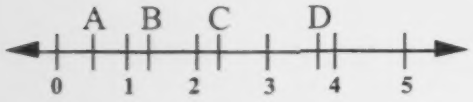
(a) $-4 \leq x \leq 6$
(b) $-4 < x < 6$
(c) $-4 \leq x < 6$
(d) $-4 < x \leq 6$

Which inequality is represented by the graph shown?



(a) $-5 < x < 6$
(b) $-5 \leq x \leq 6$
(c) $-5 \leq x < 6$
(d) $-5 < x \leq 6$

Where does $\sqrt{14}$ belong on the number line below?

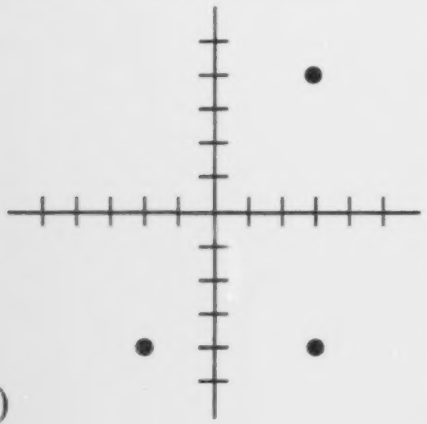


(a) A
(b) B
(c) C
(d) D

Locate the intersections of the equations.

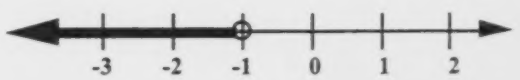
$y = 3x^2 - 8x + 5$
$x + y = 3$

Points A, B, and C are three vertices of a rectangle. Locate the fourth vertex of the rectangle.



(a) (-2, 4)
(b) (2, -4)
(c) (-3, 4)
(d) (-3, -4)

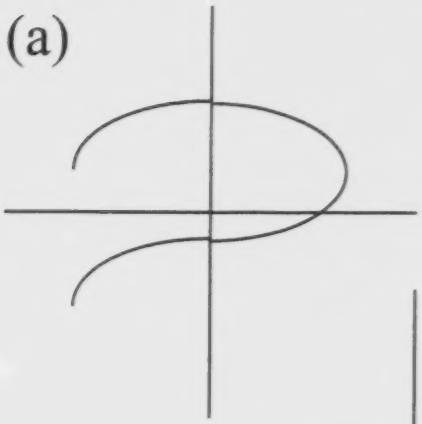
The graph below shows the solution set for which inequality.



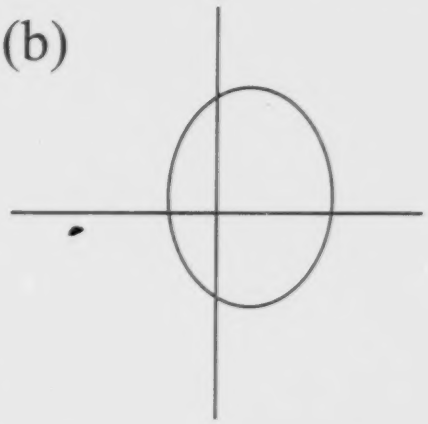
(a) $x > -1$
(b) $x < -1$
(c) $x \geq -1$
(d) $x \leq -1$

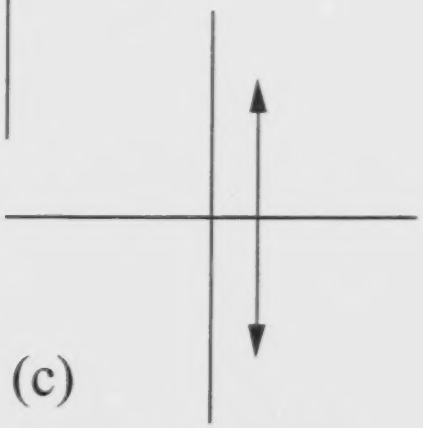
Which of these graphs illustrates a function?

(a)

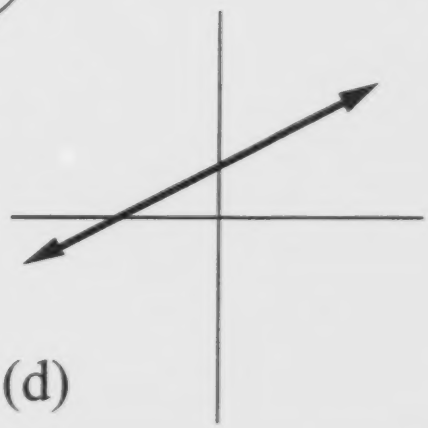


(b)





(c)



(d)

Which of the following points is an intersection of $y = x^2$ and $y = -4x + 12$?

(a) (-2, 4)
(b) (6, 36)
(c) (2, 4)
(d) (-6, 24)

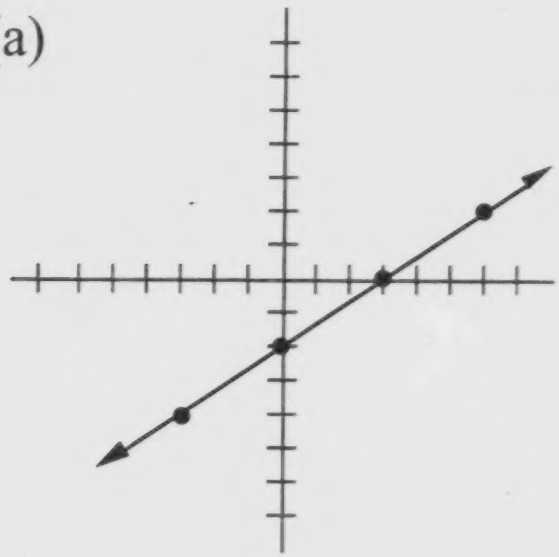
Which of the following relations is not a function?

(a) {(2,3), (2,4), (3,4), (4,5)}
(b) {(3,2), (4,2), (-4,3), (-3,4)}
(c) {(0,0), (1,1), (2,2), (3,3)}
(d) {(-1,-2), (-2,-3), (-3,-4), (-4,-5)}

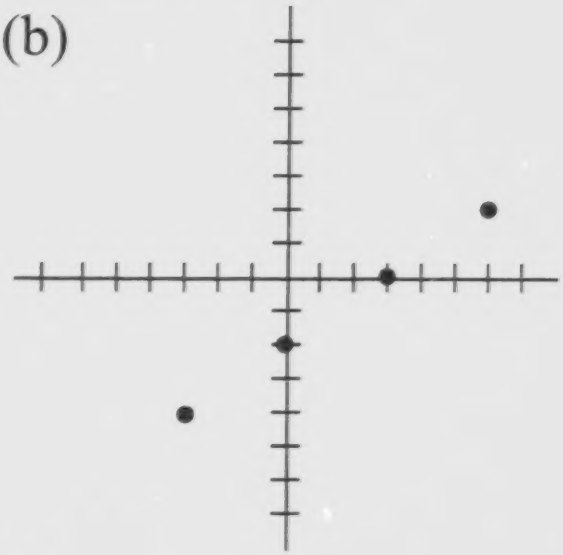
106

Graph $2x - 3y = 6$ for the given domain $\{-3,0,3,6\}$.

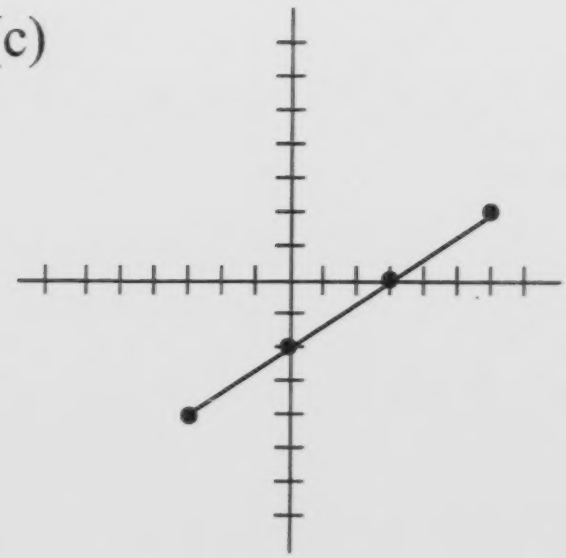
(a)



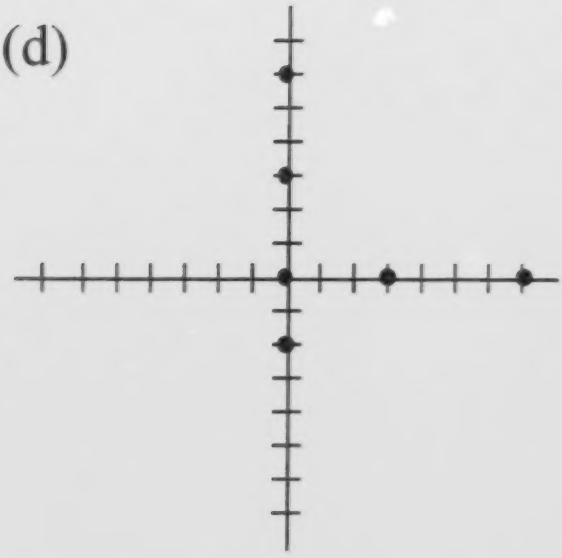
(b)



(c)

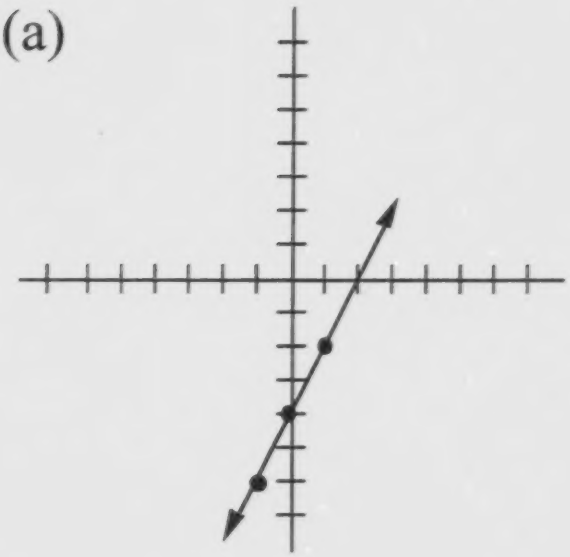


(d)

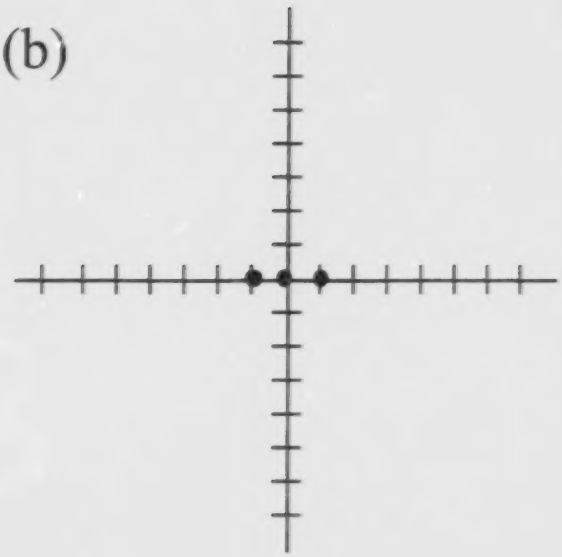


Graph $y = 2x - 4$ if $x \in \{-1, 0, 1\}$.

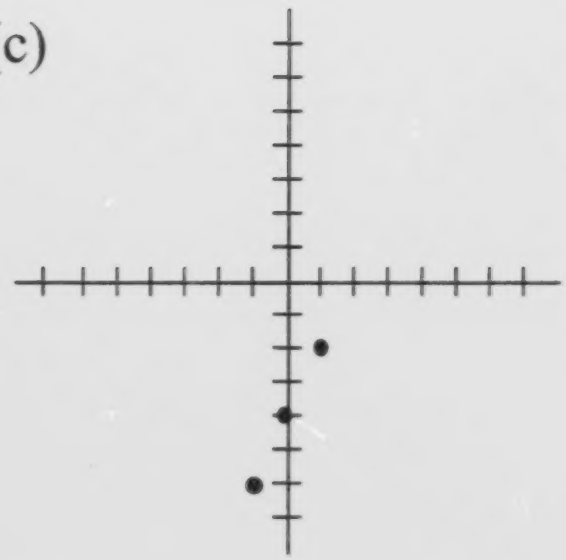
(a)



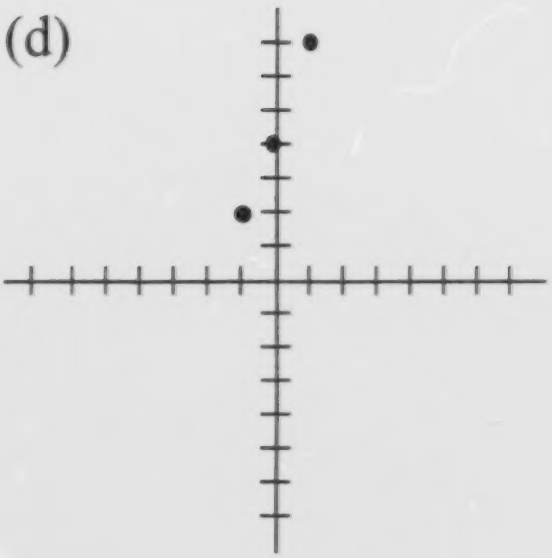
(b)



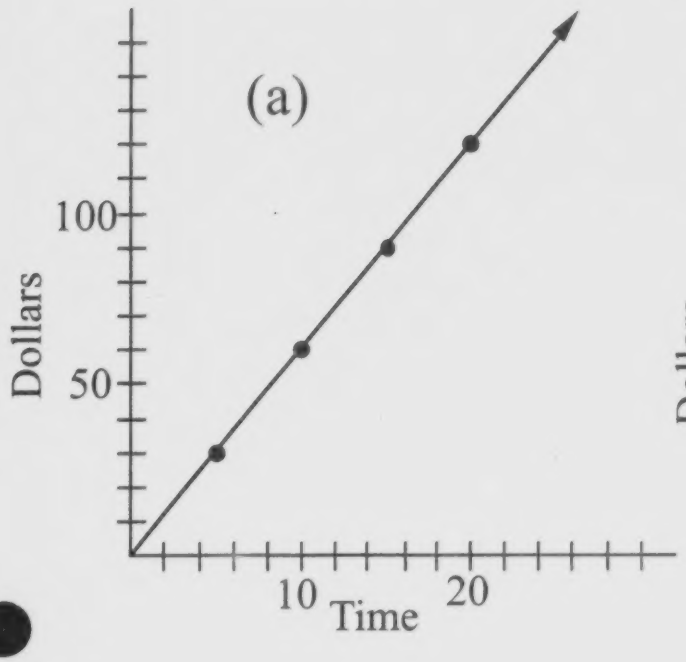
(c)

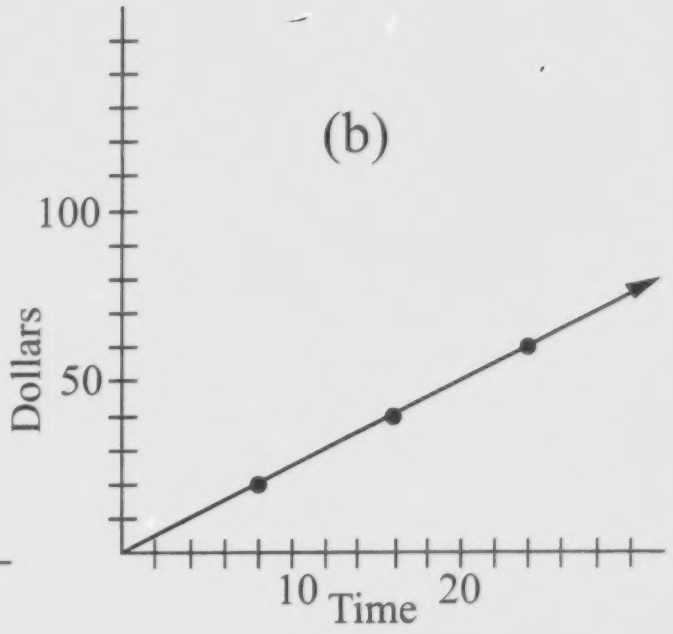


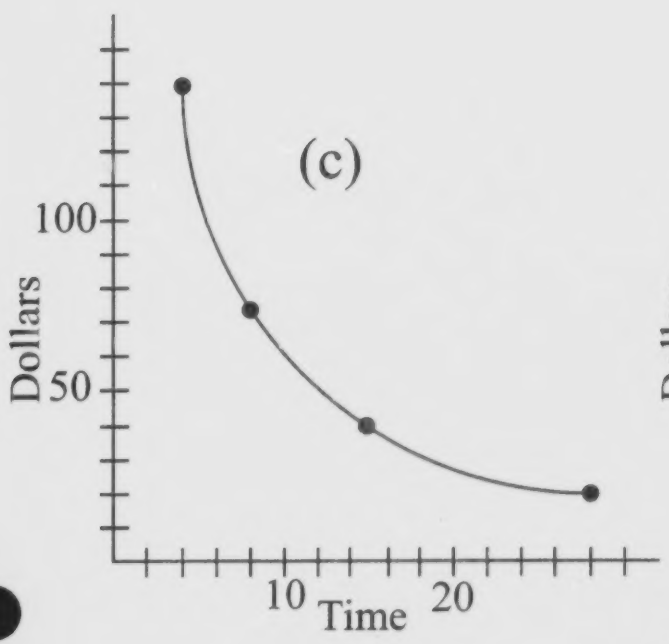
(d)

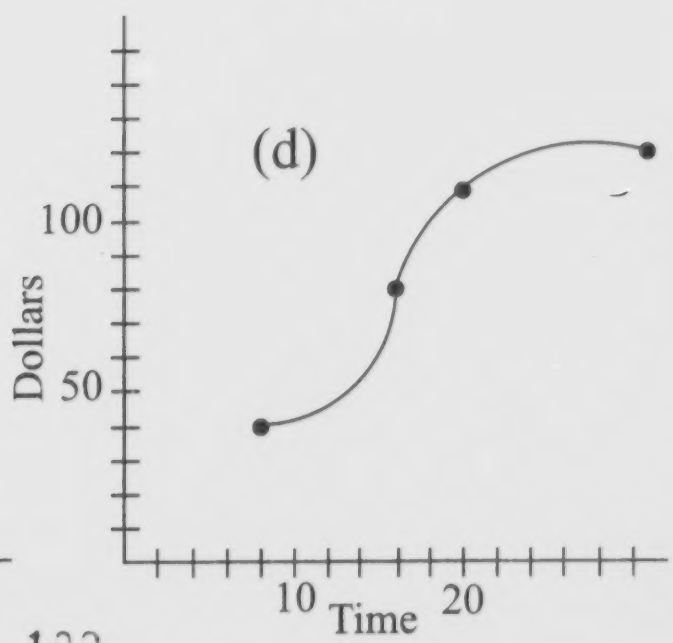


Sam earns $6.00 an hour while working at a local store. He worked 30 hours this week. Which relation pictured would generate his correct pay for the week?



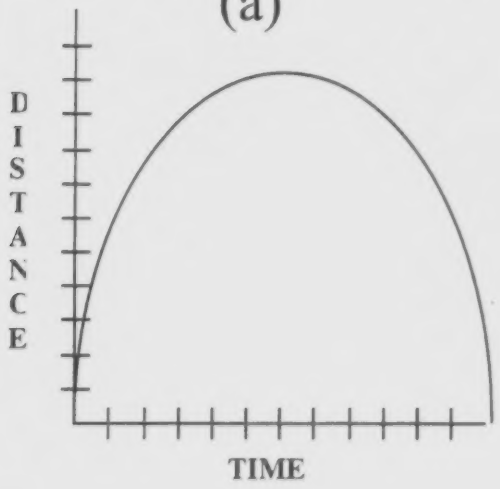




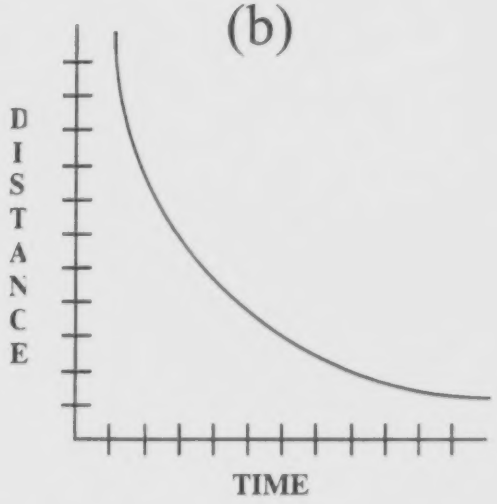


Which of the graphs below could be used to represent the distance covered by an airliner over a period of time.

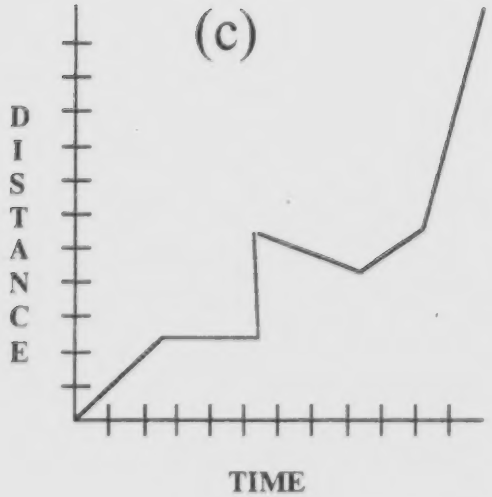
(a)



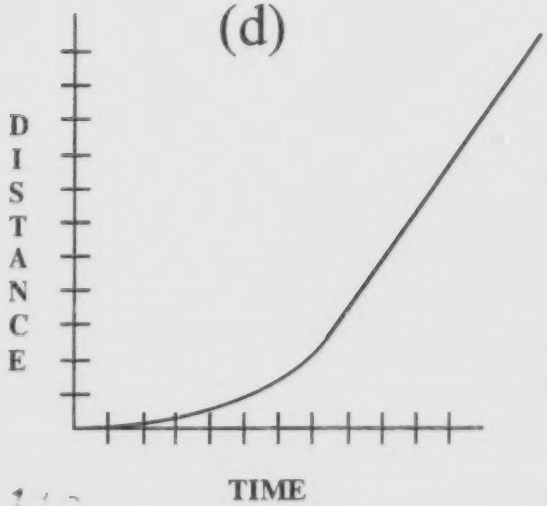
(b)



(c)



(d)



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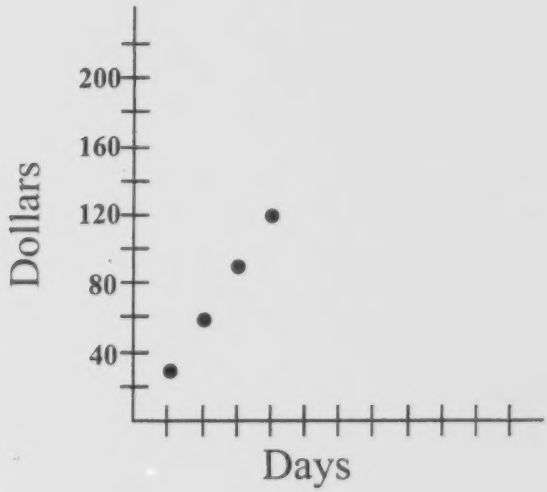
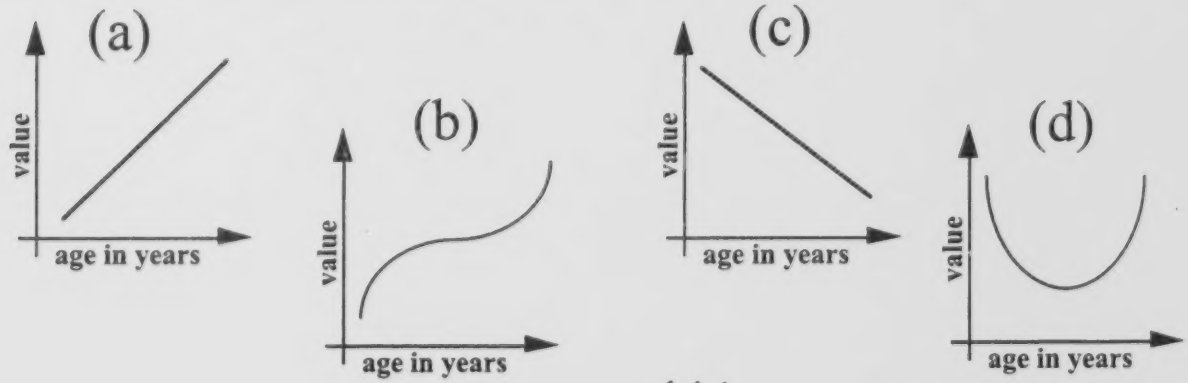
The following graph represents the cost of renting a compact car. What is the cost of renting the car for 10 days?

(a) $160
(b) $300
(c) $450
(d) $600

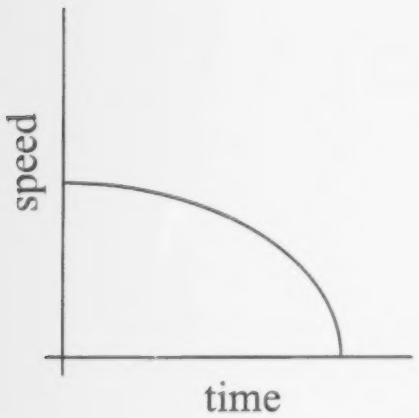


The depreciated value of an automobile can be calculated using the equation
value = original cost - $5,000 per year.
Which of the following graphs represents the relationship between value and age?

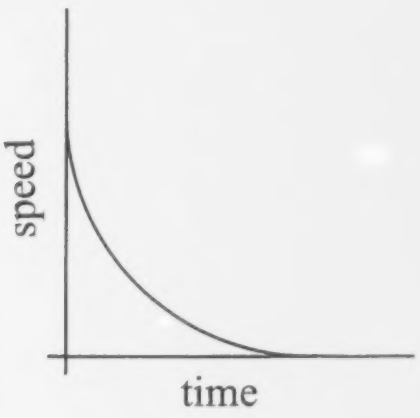


Which of the following could be the graph of a car's approach to a parking place?

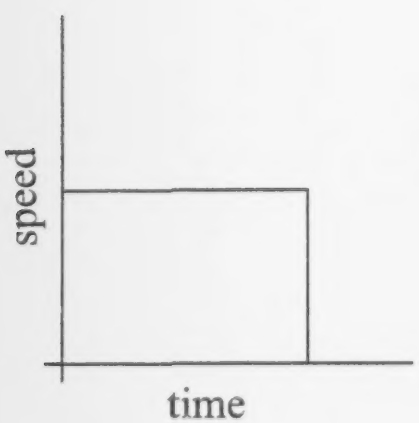
(a)



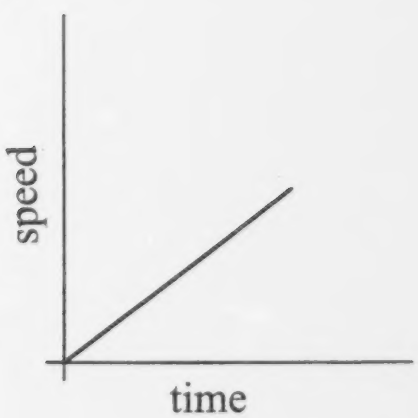
(b)



(c)



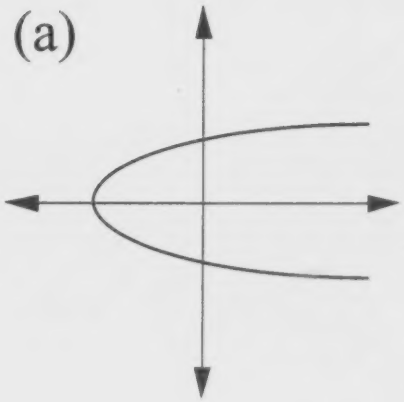
(d)



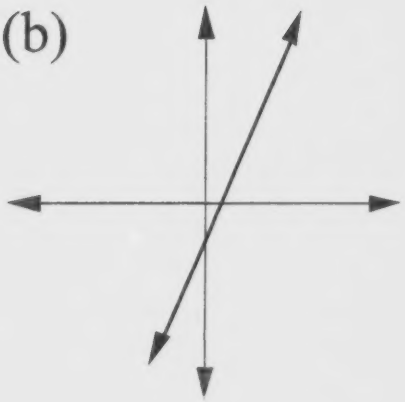
112

Which of the graphs is a function?

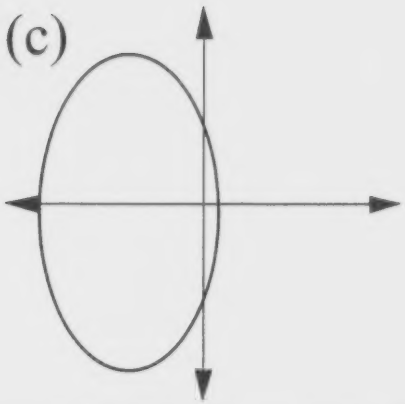
(a)



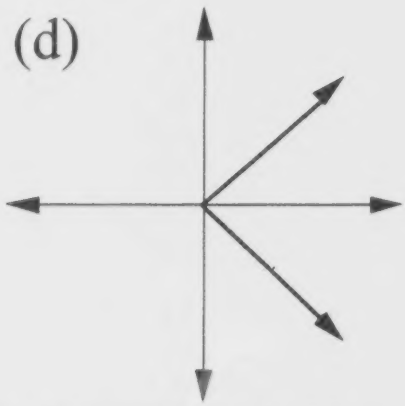
(b)



(c)



(d)



Graphs in the Real World

Follow the price of a product students use frequently. Regularly over several months, record the price of the product. Make a graph and discuss the results.

Bring to class graphs found in newspapers over a week's time. Determine the types of graphs that are used most often. Discuss their appropriateness.

Determine the party membership for North Carolina's congressmen since 1860. Discuss changes and trends and graph. Do the same for US senators.

Research records for high jump, long jump, mile run, and other physical education activities. Graph the records over time and look for trends.

Solve for x:
$3x - 5 = x + 7$

Solve for x:
$3(2 - x) = 8(x - 2)$

Solve for n: $\frac{4n}{5n+7} = \frac{2}{3}$

An equation whose graph has a slope of -2 and a y-intercept of 3 is

(a) $x = -2y + 3$
(b) $y = -2x + 3$
(c) $x = 3y - 2$
(d) $y = 3x - 2$

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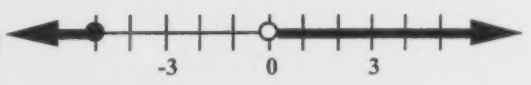
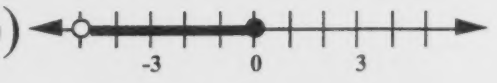
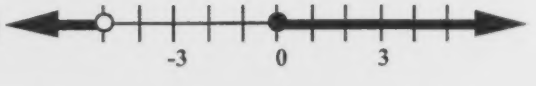
The expression $5 \leq x - 2$ is equivalent to

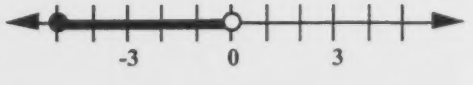
(a) $x \leq 7$
(b) $x \geq 7$
(c) $x \geq 3$
(d) $x \geq 2.5$

Which graph represents the open sentence $-5 \leq x < 0$?

(a) 

(b) 

(c) 

(d) 

Solve for x:

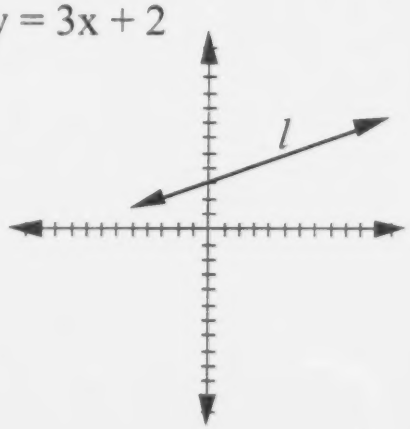
$2x - 0.3 = 1.7$

The graphs of $2y + 3 + x = 0$ and $3y + ax + 2 = 0$ are lines. If the lines are perpendicular, find the value of a.

The point (1, k) lies on the line whose equation is $x + 2y = 7$. Find the value of k.

Which equation represents line *l*, shown on the graph?

(a) $y = 2x + 3$
(b) $y = 0.5x + 3$
(c) $y = 3x + \frac{1}{2}$
(d) $y = 3x + 2$



The table represents a relation between x and y. What is the missing number in the table?

x	y
1	1
2	?
4	7
7	13

A straight line on a graph passes through the points (3, 2) and (4, 4). Which of these points also lies on the line?

(a) (1, 1)
(b) (2, 4)
(c) (5, 6)
(d) (6, 3)
(e) (6, 5)

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Solve for x in terms of a, b, and c:

$ax - b = c,\ a \neq 0$

Solve for x:

$1.27x - 0.85 = 1.67$

Solve for x:

$2.7x + 4.3 \leq 12.9$

Solve for x:

$3.7(x - 2.54) = -9.04$

Solve for m:

$$\frac{2m}{3} - 4 = 14$$

Solve for x:

$$\frac{3x}{2} - 12 = 18$$

Solve for x:

$$0.03x - 1.2 = 0.24$$

The y-intercept of the graph of the equation $y = \frac{-2x}{3} + 4$ is

(a) $\frac{-2}{3}$
(b) -2
(c) 3
(d) 4

118

Solve for x:

$0.3x + 1.7 = 2$

The cost of a telephone call from Wilson to Bat Cave is 60¢ for the first three minutes plus 17¢ for each additional minute. What is the greatest number of whole minutes of a telephone call if the cost cannot exceed $2.50?

Solve for x:

$\frac{2x}{3} - 2 = 10$

Solve for x in terms of a and b:

$2x + a = b$

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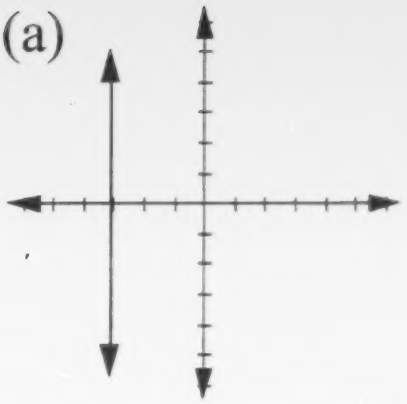
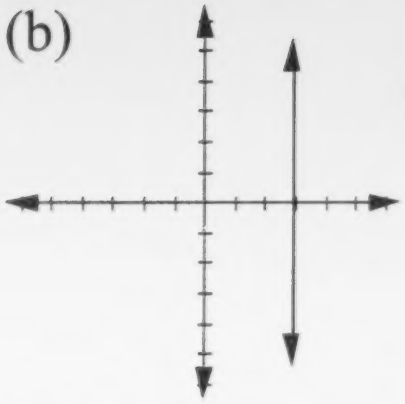
Which graph represents the equation $x = -3$?

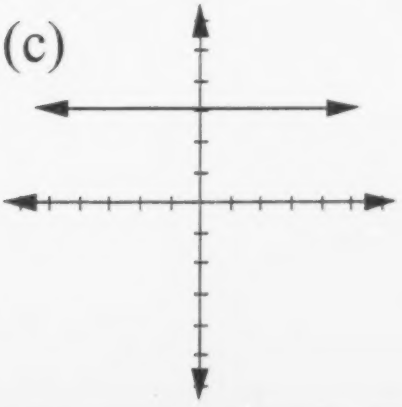
(a)



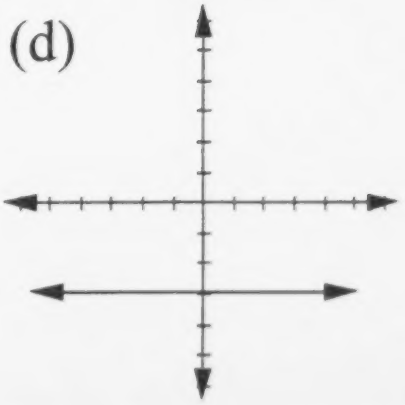
(b)



(c)

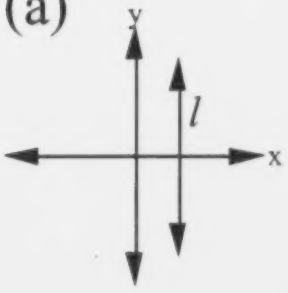


(d)

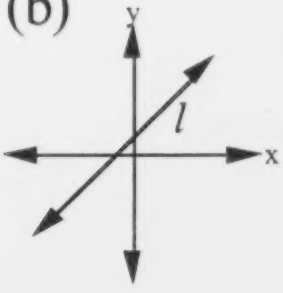


Which line l has a slope of zero?

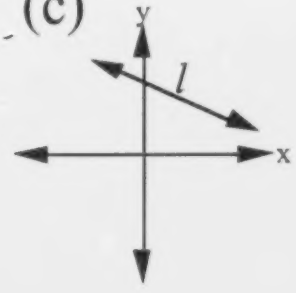
(a)



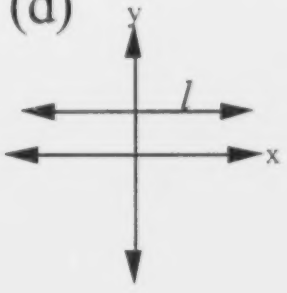
(b)



(c)



(d)



Select the x-intercept for the equation $y = 3x - 1$

(a) (3, 0)

(b) $(\frac{1}{3}, 0)$

(c) $(0, \frac{-1}{3})$

(d) $(0, \frac{1}{3})$

What is the slope of the line that passes through the points (5, 3) and (-4, 1)?

If $(x,y) \in \{(-2,-8), (1,5), (0,2), (1,1)\}$, which ordered pairs (x,y) are solutions for $3x - y = 2$?

(a) (-2,-8),(-1,5) and (0,2)
(b) (1,1) only
(c) (-2,-8) and (1,1)
(d) no solutions

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Which of these graphs represents data that behaves in a linear fashion?

(a)

(b)

(c)

(d)

When six students were asked how many hours they spend each day watching TV and how many hours they spend on homework, the results were recorded as follows:

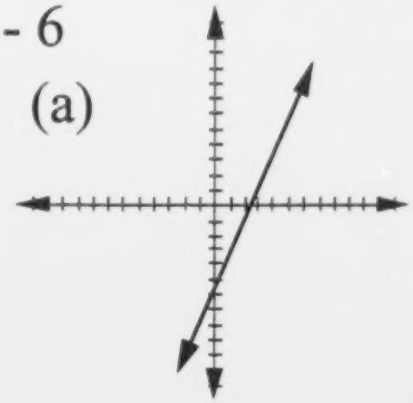
Students	TV	Homework
1	3	1
2	2	2
3	4	1
4	1	3
5	2.5	2
6	5	0

The behavior of this data could best be described as:

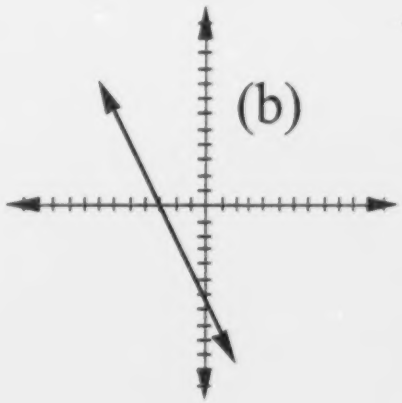
(a) random (b) linear
(c) quadratic (d) exponential

Graph $y = 2x - 6$

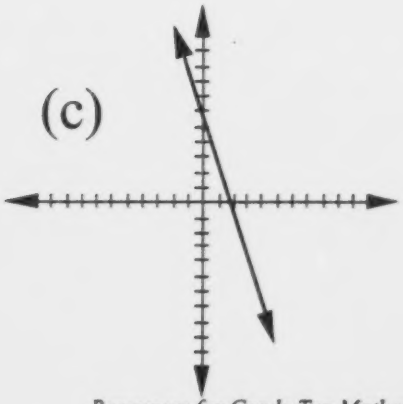
(a)



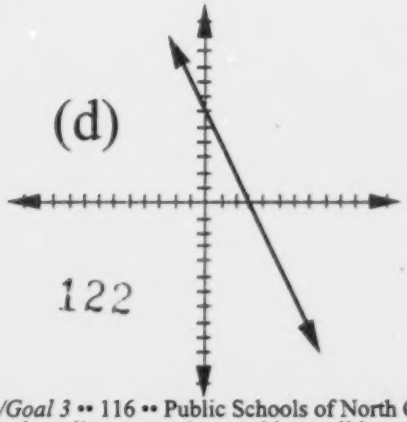
(b)



(c)



(d)



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Find the slope of the line with an equation of $2x - 3y = 6$.

(a) $\frac{3}{2}$

(b) $\frac{-3}{2}$

(c) $\frac{2}{3}$

(d) $\frac{-2}{3}$

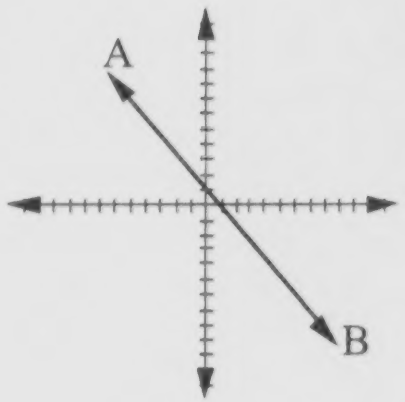
What is the slope of $\overleftrightarrow{AB}$?

(a) $\frac{-7}{6}$

(b) $\frac{7}{5}$

(c) $\frac{-2}{7}$

(d) $\frac{4}{7}$

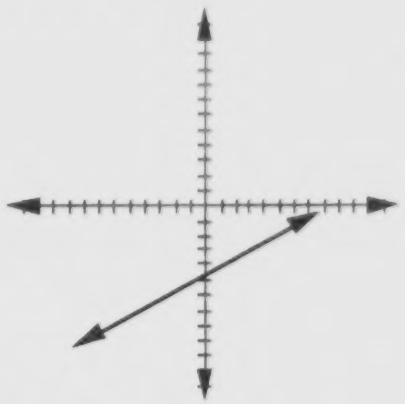


The linear function $C = .10n + 3$ represents the cost, C, of making a given number, n, of campaign buttons. The slope of this function is .10 . What does the slope represent?

(a) All buttons made total \$0.10.
(b) The button machines cost \$0.10.
(c) Three buttons cost \$0.10.
(d) Each new button cost \$0.10.

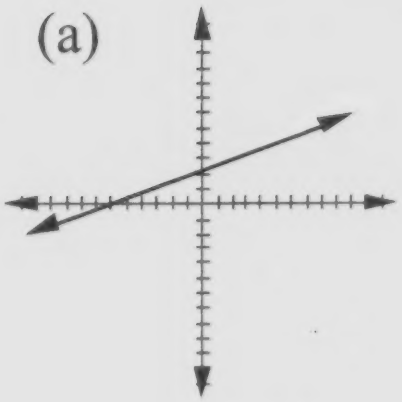
Find the slope and y-intercept of the graph.

(a) 2, (-5, 0)
(b) 0.5, (-5, 0)
(c) 2, (0, -5)
(d) 0.5, (0, -5)

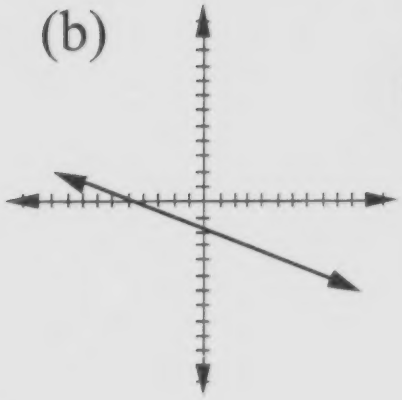


Which is the graph of $2x + 5y = 10$?

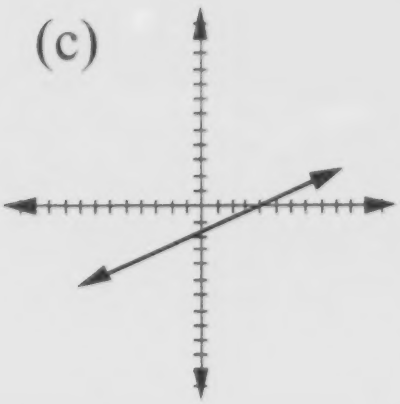
(a)



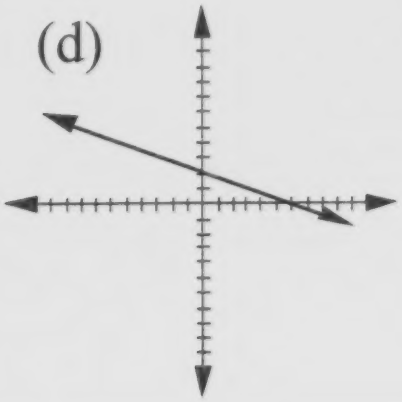
(b)



(c)

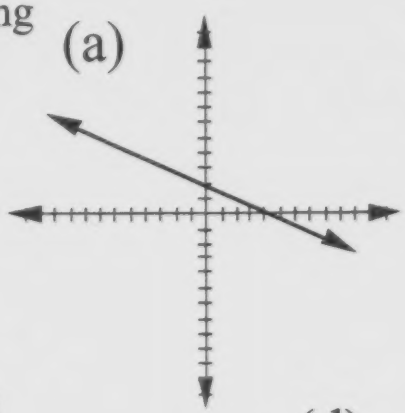


(d)

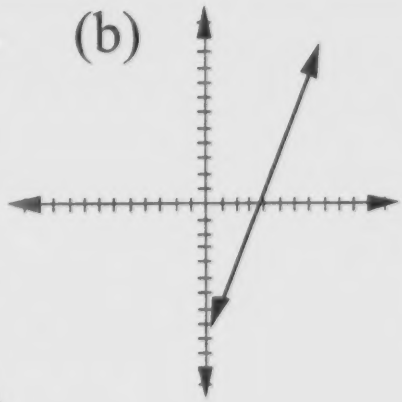


Which of the following is the graph of a line with slope $\frac{-1}{3}$ and y-intercept (0, 4)?

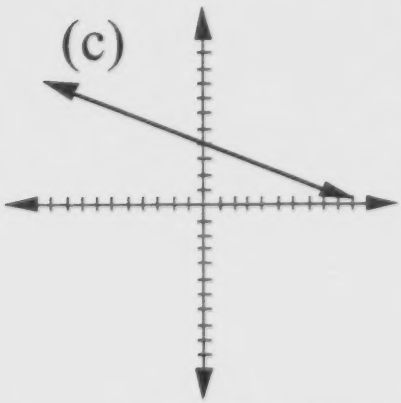
(a)



(b)



(c)



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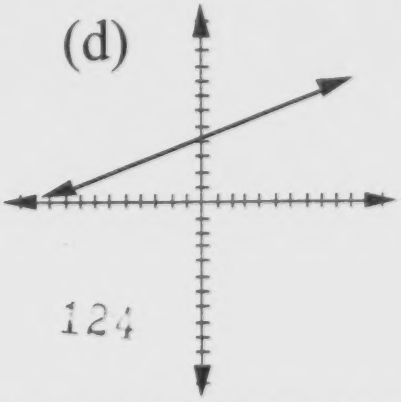

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Write the equation of the line in slope-intercept form given its slope is $\frac{-3}{5}$ and passes through the point (-1,2).

(a) $y = \frac{-3}{5}x + \frac{7}{5}$

(b) $y = \frac{-3}{5}x + \frac{3}{5}$

(c) $y = \frac{-3}{5}x - \frac{13}{5}$

(d) $y = \frac{-3}{5}x + \frac{11}{5}$

Write the slope intercept form for the equation $9x - 3y = 6$.

(a) $y = 2x - 3$
(b) $y = 2x - 3$
(c) $y = 3x - 2$
(d) $y = -3x + 2$

Write the equation of the line given points (2,0) and (-2,8).

(a) $y = 2x + 4$
(b) $y = -2x + 4$
(c) $y = 2x - 4$
(d) $y = -2x - 4$

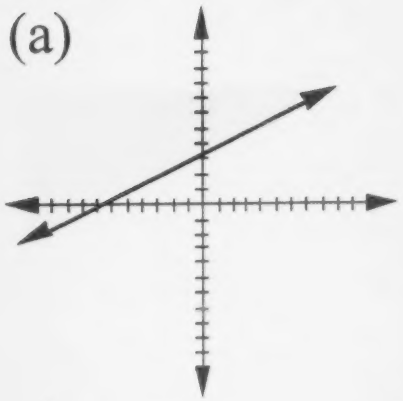
In order to "curve" the grades on a test, the teacher uses the equation $R = \frac{(C - 11)}{1.5}$, where C is the curved grade and R is number of problems answered correctly. Write the equation for the curved grade C in terms of number of problems correct.

(a) $C - 1.5R = 11$
(b) $C = 11 - 1.5R$
(c) $C = 1.5(C - 11)$
(d) $C = 1.5R + 11$

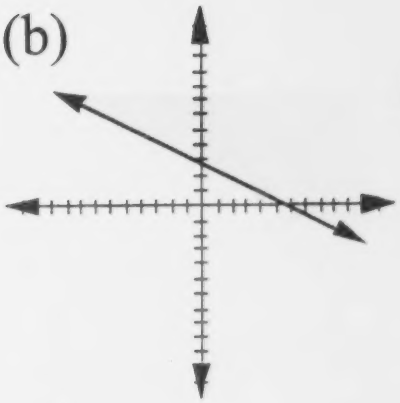
125

Graph:
$x + 2y \geq 6$

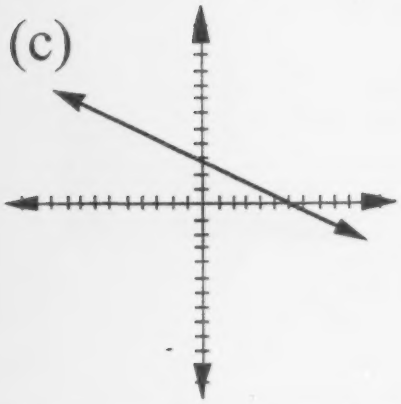
(a)



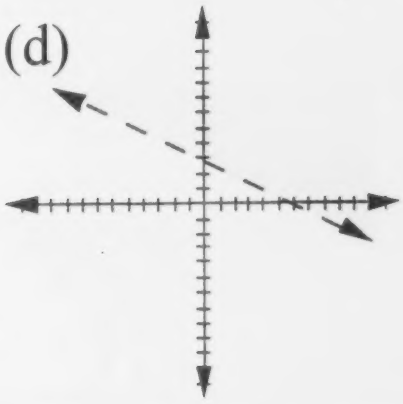
(b)



(c)

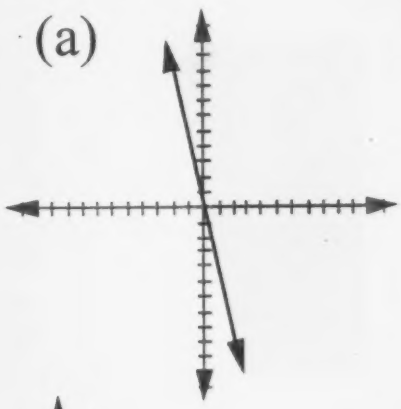


(d)



Graph:
$y \geq 4x + 1$

(a)



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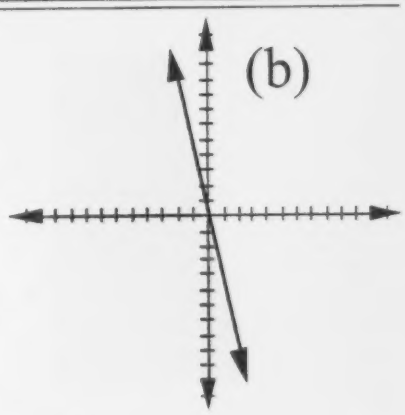
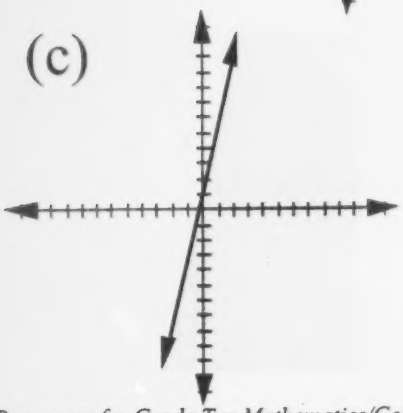


(c)



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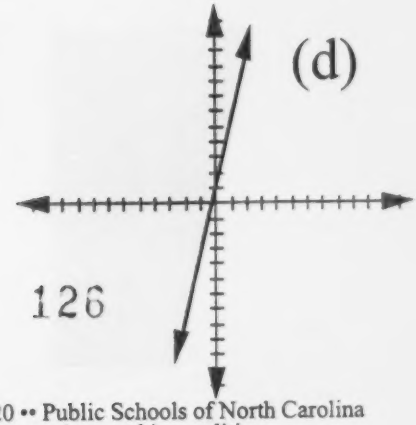


126

The perimeter of a rectangle is 48 meters. Find the width of the rectangle if the length is 14.6 meters.

(a) 33.4 meters
(b) 18.8 meters
(c) 29.2 meters
(d) 9.4 meters

Which equation represents a line that is parallel to $y = 0.5x - 2$ through point (-1, -2)?

(a) $y = 2x - 3$
(b) $y = -2x - 3$
(c) $2y = x - 3$
(d) $2y = -x - 3$

Solve:
$6 - 9y < -8y$

(a) $y < 6$
(b) $y > -6$
(c) $y > 6$
(d) $y < -6$

Determine which line is perpendicular to $3x + 2y = 6$.

(a) $3x - 2y = 2$
(b) $3x + 2y = 6$
(c) $2x - 3y = 3$
(d) $2x + 3y = -3$

Solve: $\frac{1 - 2x}{3} \leq 5$

(a) $x \leq 7$
(b) $x \geq 7$
(c) $x \leq -7$
(d) $x \geq -7$

Which word describes the graphs of these equations?

$3x = 2y - 4$
$6x - 4y = -6$

(a) parallel
(b) perpendicular
(c) vertical
(d) skew

If line *l* is perpendicular to line *m* and the slope of line *l* is undefined, what is the slope of line *m*?

(a) 1
(b) $\frac{1}{2}$
(c) 0
(d) -1

Suppose the value of a new car declines linearly over a ten-year period from the original value of $20,000 to the value of $2,000. What is the value of the car after six years?

(a) $8,800
(b) $9,200
(c) $11,000
(d) $12,800

The graph of which equation has a negative slope?

(a) $y = 5x - 3$
(b) $x + y = 5$
(c) $y - 2 = 4x$
(d) $y = 0$

The graph of the equation $x - 3y = 6$ is parallel to the graph of

(a) $y = -3x + 7$
(b) $y = \frac{-1}{3}x + 5$
(c) $y = 3x - 8$
(d) $y = \frac{1}{3}x + 8$

On a recent 25-item algebra exam, Scotty's score was 75. The teacher gave her four points for each correct answer and took off one point for each wrong answer. How many items did Scotty get correct?

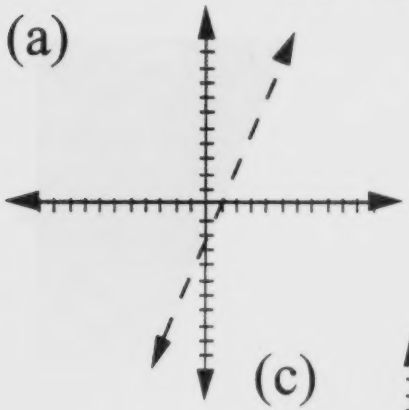
(a) 24
(b) 15
(c) 19
(d) 20

Which equation represents a line parallel to the line whose equation is $y = 2x - 7$?

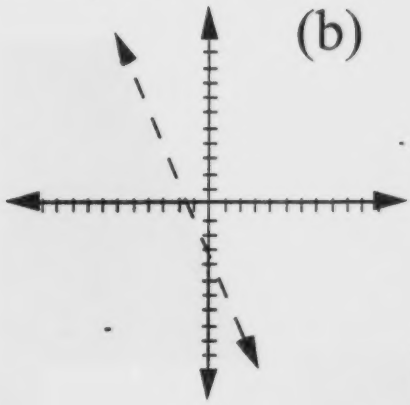
(a) $y = 2x$
(b) $y = 0.5x - 7$
(c) $y = -7$
(d) $y = -0.5x + 7$

Which is the graph of $2x - y < 3$?

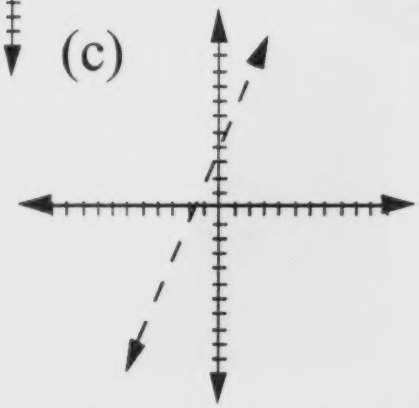
(a)



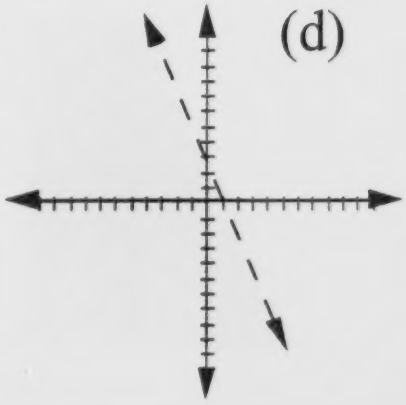
(b)



(c)



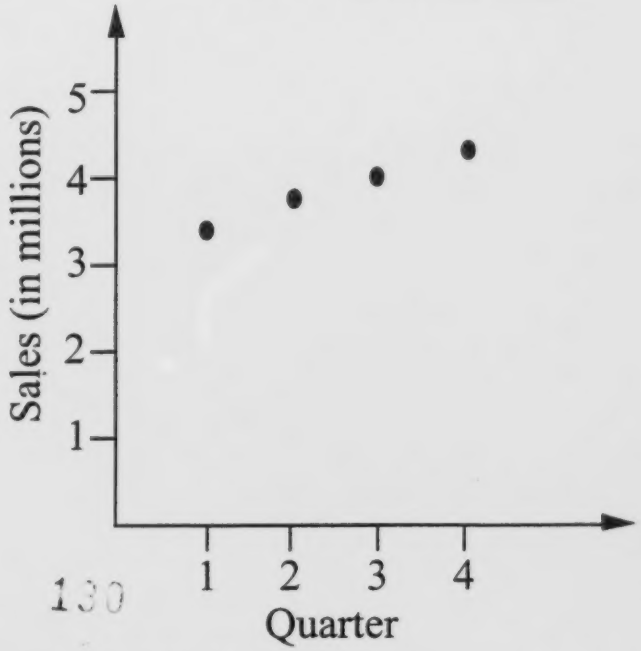
(d)



The equation $y = 0.3x + 3.1$ and the graph represent the quarterly sales projections (y) for a company in a given quarter (x). What does the slope indicate?

(a) sales will increase \$3.4 million per quarter
(b) sales will increase \$3.1 million per quarter
(c) sales will increase \$900,000 per quarter
(d) sales will increase \$300,000 per quarter

Sales Projections for Next Fiscal Year



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What is the solution set of the equation $x^2 - 3x - 4 = 0$?

(a) {-3, 1}
(b) {4, -1}
(c) {-4, 1}
(d) {3, -1}

According to language experts, without continual practice or immersion, a person will forget 0.5% daily of any new language they are studying.
The exponential equation $y = a \cdot (.995)^x$ describes this phenomenon. Suppose you had learned for the first time 25 common Arabic expressions. For the next three weeks you are unable to practice your new language skills. How many phrases would you expect to remember at the end of three weeks? At the end of one year?

Factor: $x^2 - 16$.

Bill cut two inches from one side of a square and three inches from another. If the area decreased by 50%, what was the length of the original square?

(a) 5.5 in.
(b) 6.5 in.
(c) 7.5 in.
(d) 8.5 in.

One of the roots of the equation $x^2 + 3x - 6 = 0$ is

(a) -4.37
(b) 0.46
(c) 4.37
(d) -0.46

Solve for the positive value of x:

$6x^2 - 54 = 0$

Which is an equation of a parabola which does not pass through the origin?

(a) $y = 0.5x^2$
(b) $y = x^2 - 2x$
(c) $y = x^2 - 2x + 2$
(d) $y = 2x^2$

Solve for the positive value of x:

$x^2 - 5x - 24 = 0$

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If one solution of the equation $x^2 - 5x + c = 0$ is $x = 7$, then c must equal

(a) 14
(b) 2
(c) -14
(d) -2

What are the roots of the equation $x^2 + 4x + 3 = 0$?

Jim tosses a football directly upward with an initial velocity of 80 feet per second. Use the formula $h = vt - 16t^2$ to find when the ball will hit the ground.

(a) 16 seconds
(b) 5 seconds
(c) 4 seconds
(d) 0 seconds

Determine which equation is not linear.

(a) $y = 2x + 3$
(b) $y = 3$
(c) $x = 4$
(d) $xy = 8$

Solve $x^2 + x - 6 = 6$.

(a) $x = 3$ or $x = 4$
(b) $x = -4$ or $x = 3$
(c) $x = 3$ or $x = 8$
(d) $x = 2$ or $x = 3$

Solve for x:

$(x - 4)^2 = 25$

(a) -1 or 9
(b) 1 or -9
(c) 7 or –3
(d) 9

The height h in meters of a ball t seconds after being tossed upward is given by the formula $h = -0.32x^2 + 4.35x + 7.08$. What is the maximum height the ball will climb?

(a) 7.08
(b) 15.1
(c) 1.5
(d) 21.9

The graph of $y = -3x^2 + 18x - 22$ has a maximum at what value of x?

(a) -5
(b) -3
(c) 3
(d) 5

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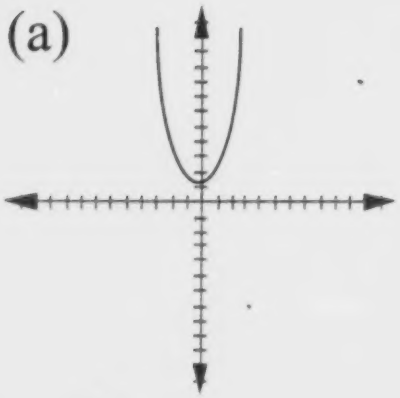
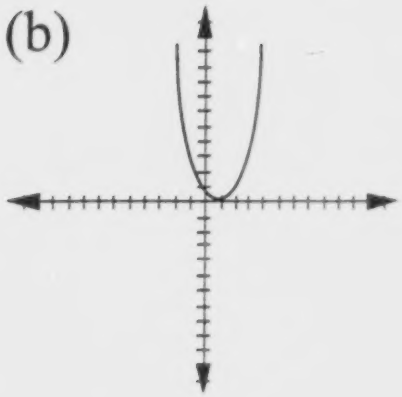
Which graph best describes $y = x^2 - 2x + 1$?

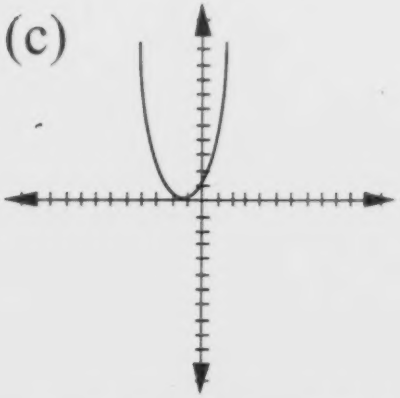
(a)



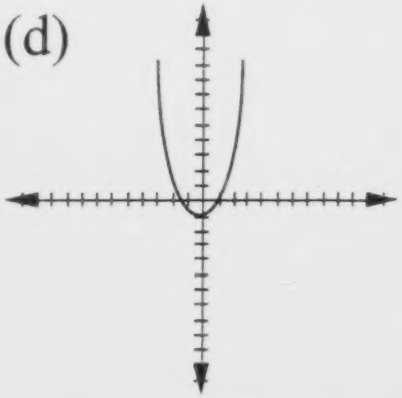
(b)



(c)

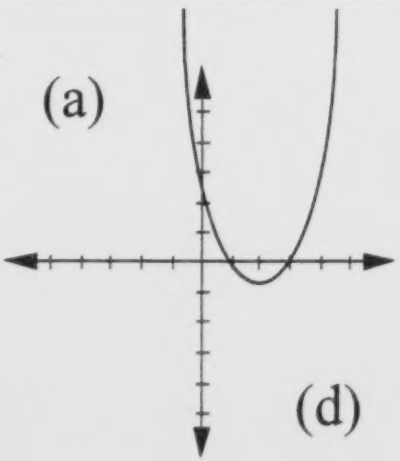


(d)



Match the equation with its graph: $y = x^2 - 4x + 3$

(a)



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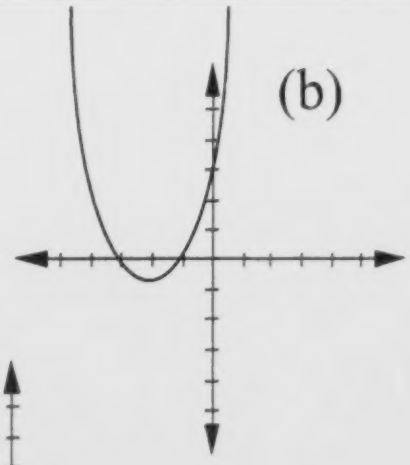

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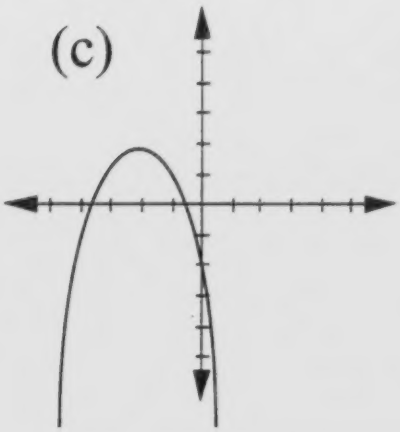

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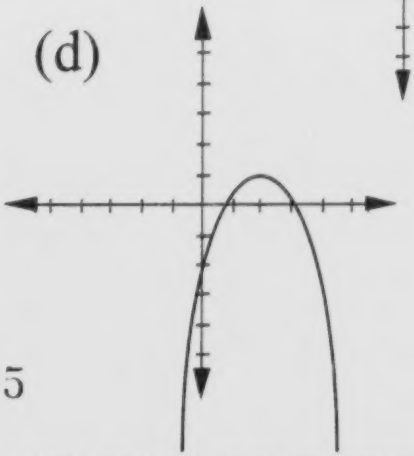
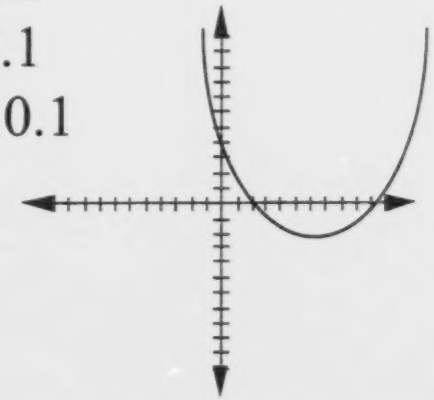


The perimeter of a rectangle is 48.8 meters. Find the longest dimension of the rectangle if its area is 126.92 m^2.

(a) 7.6
(b) 15.2
(c) 16.7
(d) 24.3

Given the following graph, approximate what the minimum y value is.

(a) -2.3
(b) 4.1
(c) 2.1
(d) 10.1



Which equation best fits this data?

x	y
0	1
1	3
2	9
3	27

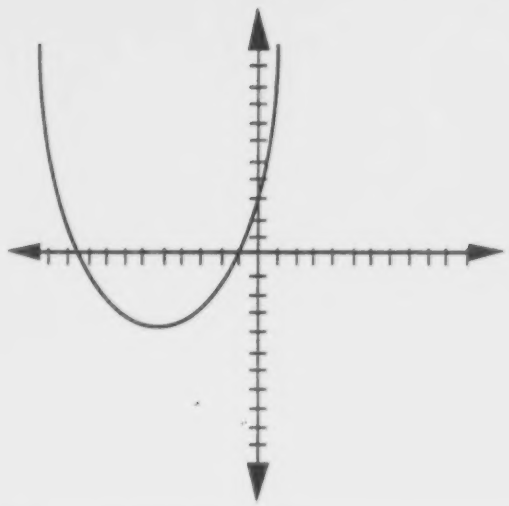
(a) $y = 3(x)^2$
(b) $y = 3^x$
(c) $y = x^3$
(d) $y = \frac{3}{x}$

Mike tosses a baseball directly upward with an initial velocity (v_o) of 83.6 feet per second. Use the formula $h = v_o t - 16t^2$ to determine when the ball will reach a height of 61.7 feet.

(a) .89 seconds
(b) 2.60 seconds
(c) 5.23 seconds
(d) 5.88 seconds

What is the minimum y-value on the graph?

(a) 0 (c) -4
(b) -2 (d) -6



The roots of the equation $2x^2 + 5x - 2 = 0$ are

(a) 5.7, -0.7
(b) -0.5, -2
(c) 2, 0.5
(d) 0.4, -2.9

Which set of data represents an exponential function?

(a)

x	y
0	2
1	3
2	10
3	29

(b)

x	y
0	2
1	6
2	10
3	14

(c)

x	y
0	0
1	2
2	8
3	18

(d)

x	y
0	2
1	8
2	32
3	128

Which of the following quadratic equations has the solution $\{1, 4\}$?

(a) $a^2 + 5a - 4 = 0$
(b) $a^2 - 5a + 4 = 0$
(c) $a^2 + 5a + 5 = 0$
(d) $a^2 + 5a = 5$

Over the last year the stock value of an internet company has grown at a rate of 17% per month. The expression $y = 13.97(1.17)^x$ describes the growth of the stock's value. y is the stock's value after x months with an initial value of \$13.97. Historically, stocks of this nature rarely exceed a value of \$150. Approximately how long will it take the stock to reach that value?

(a) 12 (c) 15
(b) 17 (d) 11

What are the coordinates of the vertex of the graph of $y = -2x^2 - 5$?

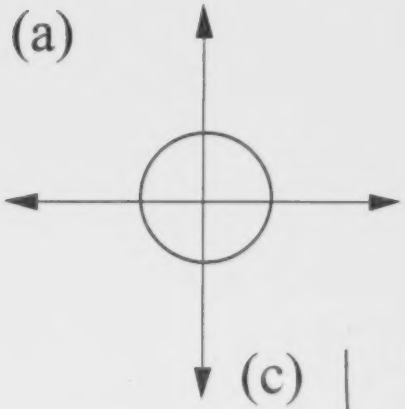
(a) (-2, -10)
(b) (-2, 5)
(c) (0, -5)
(d) (2, -10)

How many times does $\mathbf{y= x^2}$ intersect $\mathbf{y= 2^x}$?

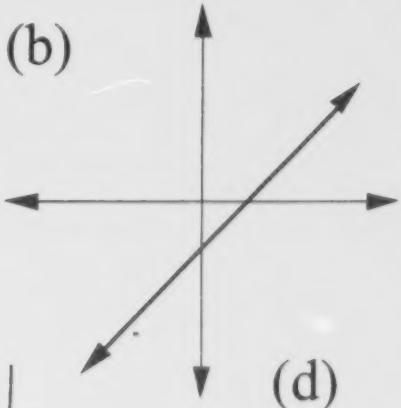
(a) 1
(b) 2
(c) 3
(d) no intersections

Which graph could represent the equation $y = x^2 - 4$?

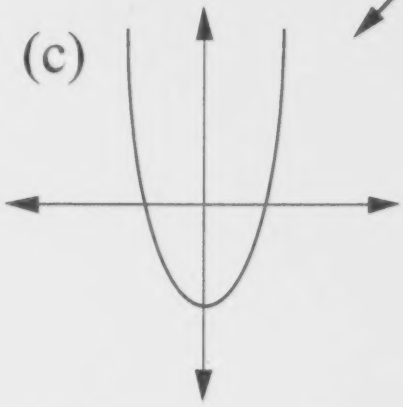
(a)



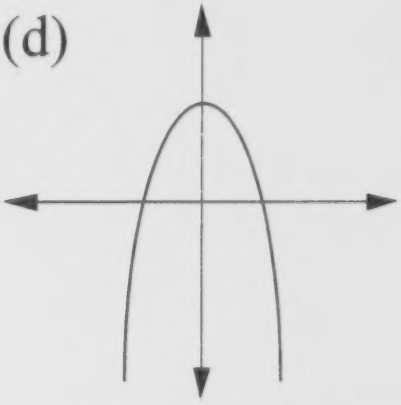
(b)



(c)



(d)



In the year he was elected president, had Thomas Jefferson invested $25 in a bank account that paid 6% interest compounded annually, how much money would be in the account by 2000?

Find two consecutive numbers that have squares differing by 99.

Betty opened a savings account with $300. The account pays 3% compounded annually. Which of the following equations shows the value (y) of the account after x years?

(a) $y = 300(1.03)^x$
(b) $y = 300 + 1.03x$
(c) $y = 300(.97)^x$
(d) $y = 300 + 9x$

In the equation $x(x - 5) = 36$, what is (are) the solution(s)?

(a) 9 only
(b) -4 only
(c) -9 and 4
(d) -4 and 9

Which expression is a perfect square?

(a) $x^2 - 4x + 4$
(b) $x^2 - 4x - 4$
(c) $x^2 - 9x + 9$
(d) $x^2 - 9x - 9$

What are the coordinates of the turning point of the parabola whose equation is $y = x^2 - 2x - 3$?

(a) (1, -4)
(b) (-1, 0)
(c) (1, 2)
(d) (-1, -2)

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Solve the following system of equations for x:

$5x + y = 19$
$2x + y = 1$

On the same set of coordinate axes, graph the following system of inequalities:

$y < 3$
$2y - x \geq 4$

Write the coordinates of a point in the solution set of the system of inequalities graphed.

Solve the following system of equations and check.

$x + 2y = 4$
$y = 2x + 7$

Frank is going to buy ties at $7.50 per tie and some shirts at $18.50 per shirt. If he buys twice as many ties as shirts and spends no more than $205, what is the greatest number of shirts he can buy?

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Solve the following system of equations for x:

$2x + y = 6$
$x - y = 3$

On the same set of coordinate axes, graph the following system of equations.

$x + y = 10$
$y = 5$

Find the area of the trapezoid bounded by the x-axis, the y-axis, and the graph of the system of equations.

Solve the following system of equations and check:

$2x - y = -1$
$x = -3y + 17$

Solve the system of equations for x:

$2x + y = 6$
$3x - y = 4$

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Which ordered pair is the solution to this system of equations?

$$y = x + 4$$
$$x + y = 2$$

(a) (1, 5)
(b) (0, 2)
(c) (-1, 3)
(d) (-4, 0)

Solve the following system of equations:

$$y - x = 1$$
$$y = \frac{-x}{2} + 4$$

On the same set of coordinate axes, graph the following system of inequalities:

$$y + x \geq 5$$
$$y < 2x + 3$$

Based on the graphs drawn, write the coordinates of a point in the solution set.

Solve the system of equations:

$$4x - 5y = 18$$
$$3x - 2y = 10$$

Graph the following system of inequalities:

$y \geq -3$
$2y - x < 6$

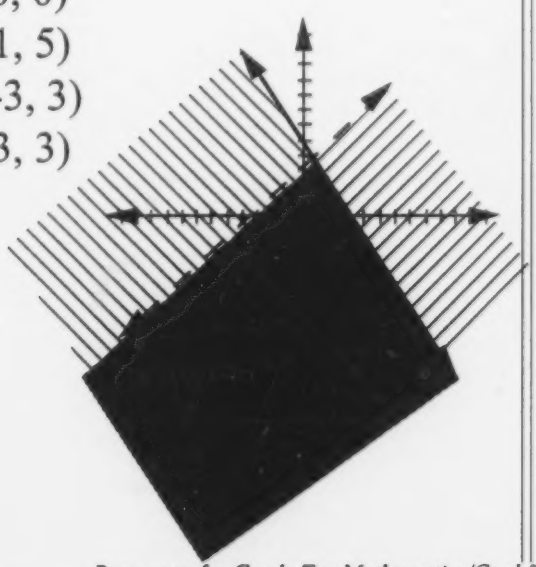
Write the coordinates of a point in the solution set of the system.

When drawn on the same set of axes, the graph of the equations $y = x + 1$ and $y + x = 3$ intersect at the point whose coordinates are

(a) (2, 1)
(b) (1, 2)
(c) (2, 3)
(d) -1, 4)

Which ordered pair is in the solution set of the system of inequalities shown in the graph?

(a) (0, 0)
(b) (1, 5)
(c) (-3, 3)
(d) (3, 3)



Solve the following system of equations:

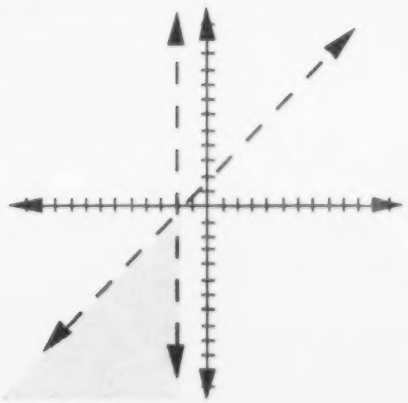
$4x + 3y = 25$
$5x + 2y = 33$

144

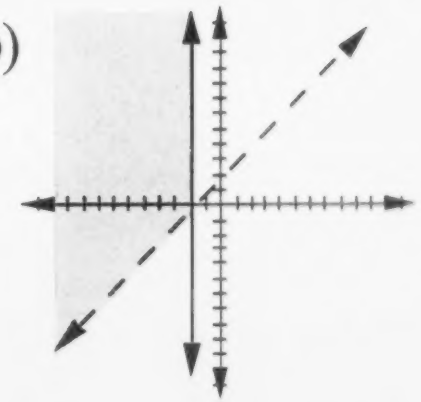
Graph the solution to the following system of inequalities:

$x \leq -2$ $\quad\quad$ $y > x + 1$

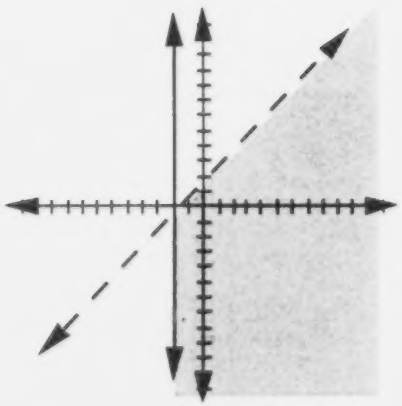
(a)



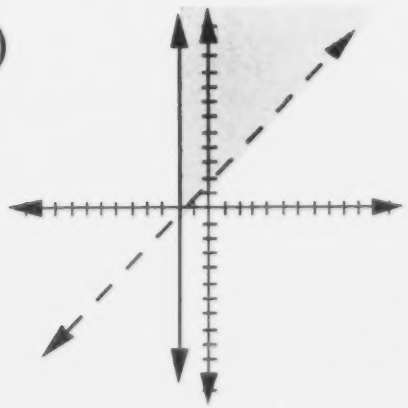
(b)



(c)



(d)



Solve:

$$5.3x - 3.1y = 12.7$$
$$2.9x - 3.8y = 3.2$$

(a) (3.44, 1.78)
(b) (2.40, 1.10)
(c) (-4.10, -0.84)
(d) (-2.40, 1.78)

The difference between the length and the width of a rectangle is 8.6 cm and the perimeter is 45.9 cm. Which system of equations would you use to find the dimensions?

(a) $l + w = 8.6$
$l + w = 45.9$
(b) $l - w = 8.6$
$2l + 2w = 45.9$
(c) $l + w = 8.6$
$2l + 2w = 45.9$
(d) $l - w = 8.6$
$l + w = 45.9$

During the band's fruit sale, six grapefruits cost as much as a dozen oranges. Terry bought two dozen oranges and a dozen grapefruit and spent $14.40. What was the cost of a dozen oranges?

(a) $0.60
(b) $1.80
(c) $3.60
(d) $7.20

The sum of the digits of a 2-digit number is 9. If the digits are reversed, the new number is 63 greater than the original number. Find the units digit of the original number.

(a) 7
(b) 8
(c) 9
(d) no such numbers exist

146

Write the system of equations needed to solve the following: The difference between two numbers is 35. If the larger number is 8 times the smaller, find the two numbers.

(a) $x + y = 35$
$y = 8x$

(b) $x + y = 35$
$x = 8y$

(c) $x - y = 35$
$y = 8x$

(d) $x - y = 35$
$x = 8y$

The mean of two numbers is 28. Find the numbers if 3 times one of the numbers equals half the other one.

(a) (24,32)
(b) (8,48)
(c) (14,42)
(d) (4,24)

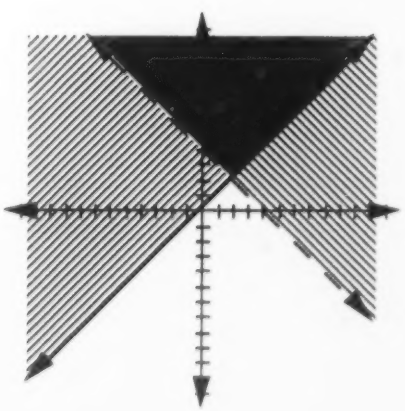
Which system of inequalities is graphed?

(a) $y \geq x$
$y > x + 4$

(b) $y \leq x$
$y < x + 4$

(c) $y \geq x$
$y > -x + 4$

(d) $y \leq x$
$y > -x + 4$



Solve the system of equations:

$-2c + 9d = 35$

$6c + 7d = 65$

(a) (-5, 1)
(b) (6, -2)
(c) (4, 3)
(d) (5, 5)

Solve the system of equations:

$a + b = 6$

$b = a + 2$

(a) (4, 2)
(b) (2, 4)
(c) (2, -4)
(d) (8, -2)

For a special order, the Coverup Company manufactured 400 shirts. Sweatshirts were priced at $35 each and T-shirts at $25 each. The company received a total of $11,500 for the shirts. How many of each type of shirt did the Coverup Company manufacture for this order?

The bill for a lunch of three hamburgers and two drinks is $9.67. The bill for a lunch of four hamburgers and three drinks is $13.21. What is the total cost of one hamburger and one drink?

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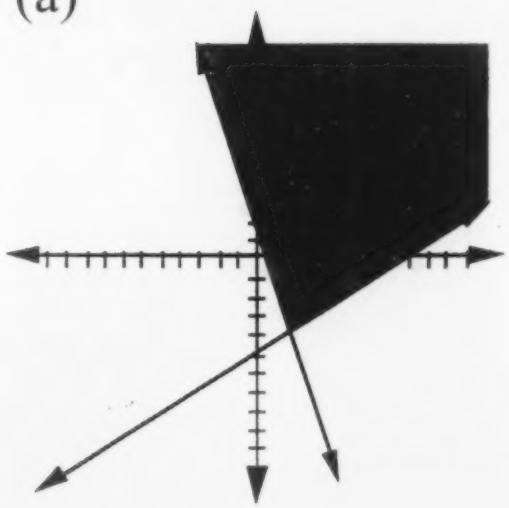
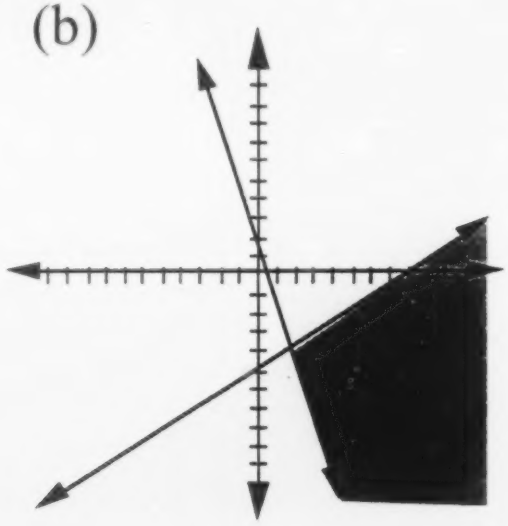
Which of the graphs represents the solution for the following system of linear inequalities?

$$2x + 3y \geq 6$$
$$3x - y \leq 5$$

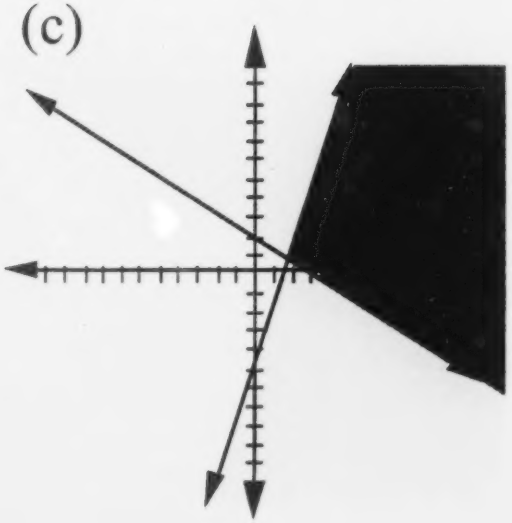
(a)



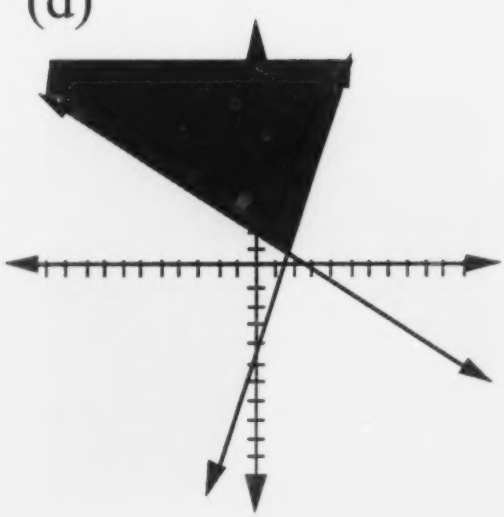
(b)



(c)



(d)



Solve the following system of equations for x:

$$x + 3y = 6$$
$$2x - 3y = 3$$

A movie theater charges $7 for an adult's ticket and $4 for a child's ticket. On a recent night, the sale of child's tickets was three times the sale of adult's tickets. If the total amount collected for ticket sales was $1,995, how many adults purchased tickets?

Graph the following system of inequalities:

$$y \geq 3x$$
$$x + y < 8$$

Write the coordinates of a point that satisfies the inequality $y \geq 3x$ but does not satisfy the inequality $x + y < 8$.

Graph the following system of inequalities:

$$y + x < 6$$
$$y \geq 2x + 3$$

Identify a point in the solution set of the system of inequalities.

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Multiply $(x - 3)(x + 2)$

From $5x^2 - 6x + 8$, subtract $3x^2 - 2x - 4$.

If the lengths of the sides of a triangle are represented by $3x$, $2x - 1$, and $3x + 2$, express the perimeter of the triangle as a binomial in terms of x.

Factor $x^2 + 5x$.

151

The expression $\frac{-24x^6}{8x^3}$ $x \neq 0$, is equivalent to

(a) $3x^2$
(b) $-3x^3$
(c) $-3x^2$
(d) $3x^3$

For which value of x is the expression $\frac{3}{5-x}$ undefined?

(a) 0
(b) 5
(c) 3
(d) -5

The sum of $\frac{x}{3}$ and $\frac{3x}{4}$ is

(a) $\frac{4x}{12}$
(b) $\frac{3x^2}{12}$
(c) $\frac{13x}{12}$
(d) $\frac{4x}{7}$

Factor:

$$x^2 + 6x + 8$$

132

The expression

$$\frac{25m^3+10m^2-5m}{5m}$$

$m \neq 0$, is equivalent to

(a) $5m^2 + 2m - 1$
(b) $5m^2 + 2m$
(c) $6m$
(d) $5m^2 + 5m - 1$

Express $(2x - 3)(x + 5)$ as a trinomial.

Perform the indicated operations and express as a trinomial:

$(x + 4)(x - 2) + 3x$

What is the product of $3y^2$ and $4y^5$?

(a) $7y^{10}$
(b) $7y^7$
(c) $12y^{10}$
(d) $12y^7$

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Express, in terms of x, the mean of $(4x - 6)$, $(2x + 3)$, and $(3x + 3)$.

Express $9 - y^2$ as the product of two binomial factors.

The expression

$$\frac{15k^3 - 9k^2 + 3k}{3k}$$

$k \neq 0$, is equivalent to

(a) $5k^2 - 3k + 1$
(b) $5k^2 - 3k$
(c) $15k^3 - 9k^2$
(d) $3k$

Expressed as a single fraction in lowest terms, the sum of $\frac{3x}{4}$ and $\frac{2x}{3}$ is equivalent to

(a) $\frac{5x}{7}$
(b) $\frac{5x}{12}$
(c) $\frac{17x}{7}$
(d) $\frac{17x}{12}$

154

Express $2x^2 - x - 3$ as the product of two binomials.

Express $\frac{5a}{6} - \frac{4a}{9}$ as a single fraction in simplest form.

The quotient of $\frac{14x^6y}{2x^2y}$

$x \neq 0, y \neq 0$, is

(a) $7x^3$
(b) $7x^4$
(c) $7x^3y$
(d) $7x^4y$

From $5x^2 + 3x - 6$ subtract $4x^2 - 5x + 6$.

Simplify:
$(6x^2y - 3y^4) - (2x^2y - 10)$

(a) $4x^2y - 3y^4 + 10$
(b) $4x^2y - 3y^4 - 10$
(c) $8x^2y - 3y^4 - 10$
(d) $4 - 3y^4 + 10$

Simplify:
$(6x + 8) + (5x - 9)$

(a) $x - 1$
(b) $x + 1$
(c) $11x + 1$
(d) $11x - 1$

Simplify:
$5x(6x^2 - 4x + 2)$

(a) $11x^3 - 9x^2 + 7x$
(b) $30x^2 - 20x + 10x$
(c) $11x^2 + x + 7$
(d) $30x^3 - 20x^2 + 10x$

Simplify:
$(8a^2b^4)(3a^2b^4)(-a^2b^4)$

(a) $11a^2b^4$
(b) $-24a^2b^4$
(c) $-24a^6b^{12}$
(d) $32a^8b^{16}$

138

Simplify:
$(4h^3k^5)^2$

(a) $8h^5k^7$
(b) $8h^6k^{10}$
(c) $16h^5k^7$
(d) $16h^6k^{10}$

Simplify:
$(3x + 4)(3x - 4)$

(a) $9x^2 + 24x - 16$
(b) $9x^2 - 16$
(c) $9x^2 - 12x - 8$
(d) $9x^2 + 16$

Write $(x^2)^5$ in simplest form.

(a) x^7
(b) x^{10}
(c) $2x^5$
(d) $2x^{10}$

Simplify:
$(x - 7)^2$

(a) $x^2 - 14x + 49$
(b) $x^2 - 7x + 49$
(c) $x^2 + 14x + 14$
(d) $x^2 + 14x + 49$

Factor:

$14xy^2 + 2xy$

(a) $2xy(7y)$
(b) $2(7xy^2 + xy)$
(c) $2xy(7y + 1)$
(d) prime

Simplify:

$(5x - 3y^3)^2$

(a) $25x^2 - 9y^5$
(b) $25x^2 - 15xy^3 + 9y^6$
(c) $25x^2 - 30xy^3 + 81y^5$
(d) $25x^2 - 30xy^3 + 9y^6$

Find the greatest common monomial factor of

$6x^4y^3 + 9x^4y^2 - 6x^3y^3$

(a) $3xy$
(b) $3x^2y^2$
(c) $3x^3y^2$
(d) $3x^4y^3$

Simplify:

$(y^2 - 5)(y^3 - 2y^2 - 1)$

(a) $y^5 - 2y^4 - 5y^3 - 9y^2 + 5$
(b) $y^6 - 2y^4 - 5y^3 - 11y^2 + 5$
(c) $y^6 - 2y^4 - 5y^3 - y^2 + 10y + 5$
(d) $y^6 - 2y^4 - 5y^3 + 9y^2 + 5$

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Factor:

$7x^2 + 63$

(a) $7(x + 3)(x + 3)$
(b) $7(x - 3)(x - 3)$
(c) $7(x + 3)(x - 3)$
(d) $7(x^2 + 9)$

Simplify:

$$\frac{6x^3y^3 - 12x^3y^2 + 8x^6y^5}{2xy}$$

(a) $3x^4y4 - 6x^4y^3 + 4x^7y^6$
(b) x^9y^7
(c) $3x^2y^2 - 6x^2y + 4x^5y^4$
(d) $3x^3y^2 - 6x^3y + 4x^6y^4$

Factor:

$81x^2 - 25y^4$

(a) $(9x + 5y)(9x - 5y)$
(b) $(9x + 5y^2)(9x - 5y^2)$
(c) $(9x + 5y^2)^2$
(d) $(9x - 5y^2)^2$

Simplify: $\frac{-3x^8y10}{18x^4y^5}$

(a) $\frac{-x^2y^2}{15}$

(b) $\frac{-x^2y^2}{6}$

(c) $\frac{-x^4y^5}{6}$

(d) $-6x^4y^5$

Factor completely:

$3y^2 + 23y + 14$

(a) $(3y + 14)(y + 1)$
(b) $(3y + 1)(y + 14)$
(c) $(3y + 7)(y + 2)$
(d) $(3y + 2)(y + 7)$

Factor completely:

$72x^2y - 98y$

(a) prime
(b) $y(36x + 49)(36x - 49)$
(c) $2(6xy + 7)(6xy - 7)$
(d) $2y(6x + 7)(6x - 7)$

Factor:

$20m^2 - 27mn - 8n^2$

(a) $(4m - 2)(m - 4)$
(b) $(4m + 2)(m - 4)$
(c) $(4m - n)(5m + 8n)$
(d) $(4m + n)(5m - 8n)$

Factor:

$81x^2 - 126x + 49$

(a) $(81x - 49)(x - 1)$
(b) $(9x - 7)(9x + 7)$
(c) $(9x + 7)^2$
(d) $(9x - 7)^2$

What is the degree of the polynomial $(x^3 + 1)^2(x^2 + 2)^4$ in x?

(a) 5
(b) 6
(c) 14
(d) 18

Factor:

$n^2 - 5n - 36$

(a) $(n + 9)(n + 4)$
(b) $(n + 9)(n - 4)$
(c) $(n - 9)(n + 4)$
(d) $(n - 9)(n - 4)$

Factor completely:

$x^3 + 5x^2 + 6x$

Factor:

$x^2 + 5x + 6$

(a) $(x + 3)(x + 2)$
(b) $(x + 6)(x + 1)$
(c) $(x + 5)(x + 1)$
(d) $(x - 3)(x - 2)$

Express in simplest form, $\frac{x}{2} - \frac{x}{3} + \frac{x}{4}$ is equivalent to

(a) $\frac{x}{3}$
(b) $\frac{x}{24}$
(c) $\frac{3x}{24}$
(d) $\frac{5x}{12}$

Factor:

$a^2 - 12x + 11$

(a) (a - 11)(a - 1)
(b) (a - 11)(a + 1)
(c) (a - 12)(a - 1)
(d) (a - 12)(a + 1)

The perimeter of a square is 20x - 4. Which expression represents a side of the square in terms of x?

(a) 5x
(b) 10x - 2
(c) 8x - 16
(d) 5x - 1

Factor:

$y^2 + 8x - 9$

(a) (y - 9)(y + 1)
(b) (y + 9)(y - 1)
(c) (y - 8)(y + 1)
(d) (y + 8)(y - 1)

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Grade 10 Mathematics

Goal 4: This strand will focus on using statistical methods, analysis and relationships to collect, organize and describe data and communicate the results and determining the probability of simple and compound events and solve related problems.

4.01 The learner will use statistics to analyze and solve real-world problems. pp. 158 - 167

4.02 The learner will use probability to solve real-world problems. pp. 168 - 179

4.03 The learner will fit a line or curve to a set of data and use this line or curve to make predictions about data. pp. 180 - 184

The following frequency table shows data collected by the police in an automobile speed check.

Speed Interval	Frequency
66-75	45
56-65	110
46-55	120
36-45	25

Which interval contains the median speed?

Complete the frequency table for the following scores on a math test: 68, 77, 93, 61, 84, 88, 76, 91, 80, 100, 89, 82, 93, 88, 70, 97, 87, 88, 90, 85, 79, 99, 97, 88, 82, 100, 96, 95, 96, 100.

Score	Tally	Frequency
61-65		
66-70		
71-75		
76-80		
81-85		
86-90		
91-95		
96-100		

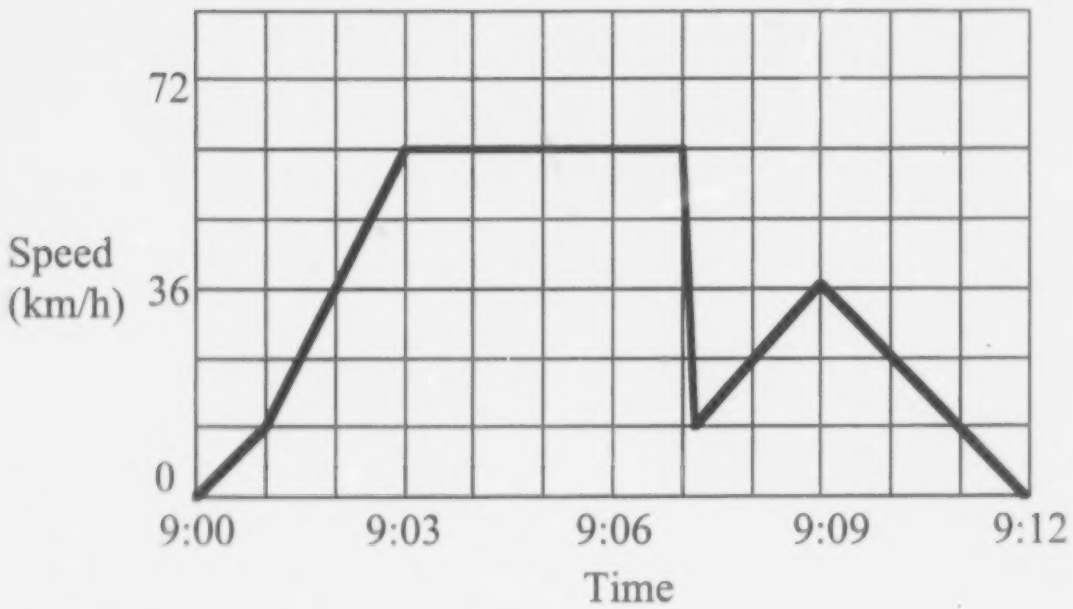
What percentage of the students who took the test scored above 75?

In a store, dress sizes range from 7 through 15. At inventory time, the sizes of one style of dress on the rack were: 7, 7, 9, 9, 9, 11, 11, 11, 13, 13, 13, 13, 13, and 15. What is the mode?

Three numbers are represented by 2x, 3x, and 4x. Find the value of x if the mean of the three numbers is 15.

164

Kelly went for a drive in her car. During the drive, a cat ran in front of the car. Kelly slammed on the brakes and missed the cat. Slightly shaken, Kelly decided to return home by a shorter route. The graph below is a record of the car's speed during the drive. What was the maximum speed, in kilometers per hour, of the car during the drive?



The table below shows the daily attendance at two movie theaters for five days. Find the mean and the median attendance for each theater over the five days. Which statistic, the mean or the median, best describes the typical daily attendance for five days at Theater A? For Theater B?

Day	A	B
1	100	72
2	87	97
3	90	70
4	10	71
5	91	100

Which of the following pieces of information would not be useful in deciding what type of car is the most economical to drive?

(a) Median income of drivers
(b) Range of insurance costs
(c) Average miles per gallon
(d) Typical costs of repairs per year
(e) Cost of routine maintenance

The mean of a set of five numbers is ten. If all the numbers are doubled, what is the mean of this new set of numbers?

The scores 12, 17, 15, and x have a mean of 13. What is the value of x?

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Tracy recorded the number of calories she consumed for 20 consecutive days: 1200, 1153, 1106, 976, 980, 972, 1405, 1100, 1325, 1149, 1252, 972, 1341, 962, 1243, 1070, 1438, 1305, 1367, 1163. Complete the tables below to find the frequency and cumulative frequency in each interval. Construct a cumulative frequency histogram.

Interval	Tally	Frequency
900-999		
1000-1099		
1100-1199		
1200-1299		
1300-1399		
1400-1499		

Interval	Cumulative Frequency
900-999	
1000-1099	
1100-1199	
1200-1299	
1300-1399	
1400-1499	

Which interval in the frequency table contains the median?

(a) 1000-1099
(b) 1100-1199
(c) 1200-1299
(d) 1300-1399

Which interval in the frequency table contains the mean?

(a) 1000-1099
(b) 1100-1199
(c) 1200-1299
(d) 1300-1399

Find the median of the following numbers.

546 689 490 531 603 549 663
515 557 673 650 546 502 547
496 426 515 637 541 547

(a) 661.5
(b) 508.5
(c) 502.5
(d) 503

70% of students in a survey said they eat fast food hamburgers. 40% said they are vegetarians. What can you conclude?

(a) There are 110 students
(b) There is no meat in a fast food hamburger
(c) Some students lied
(d) There are at least 10% of students that eat fast food hamburgers and are vegetarians

In 20 games, Nancy scored these points: 36, 32, 28, 30, 33, 36, 24, 33, 29, 30, 30, 25, 34, 36, 34, 31, 36, 29, 30, 34. Complete the table and construct a frequency histogram.

Interval	Tally	Frequency
35-37		
32-34		
29-31		
26-28		
23-25		

In the table below, which interval contains the median?

(a) 1 - 5
(b) 6 - 10
(c) 11 - 15
(d) 16 - 20

Interval	Frequency
16-20	1
11-15	3
6-10	3
1-5	3

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4	6 7 7 8
5	3 4 7 7
6	1 1 8 9 9
7	4 8
8	1 1 1 9 9
9	2 3 7 8 9

Use the stem-and-leaf plot of 4th period's Geometry test scores shown above.

What is the mode?
(a) 9
(b) 47
(c) 81
(d) 89

What is the median?
(a) 57
(b) 65
(c) 72.5
(d) 69

A die is rolled 600 times with the following results.

Face	Number of Times
1	95
2	96
3	108
4	100
5	104
6	97

Is the die fair?
(a) Yes, the numbers were close to the expected results.
(b) No, the numbers were not equal to the expected results.
(c) Yes, everything averaged out evenly.
(d) No, only one number, the 4, was what it should be.

If the median for the following set is 50, what is the value of x?
{20, 40, x, 52, 60, 63}

(a) 48
(b) 49
(c) 50
(d) 51

A set of five distinct positive integers has a median of 20 and a mean of 17. How large could the largest of these five numbers be?

Which statement is true for the following group of data?
11, 13, 18, 19, 19

(a) mean > median
(b) mean > mode
(c) mode = median
(d) median < mode

In the set of scores below, how many scores are less than the mean?
32, 40, 42, 52, 59

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The table shows the results of a math test given to a number of students.

Interval	Frequency
96-100	9
91-95	7
86-90	9
81-85	8
76-80	6
71-75	5

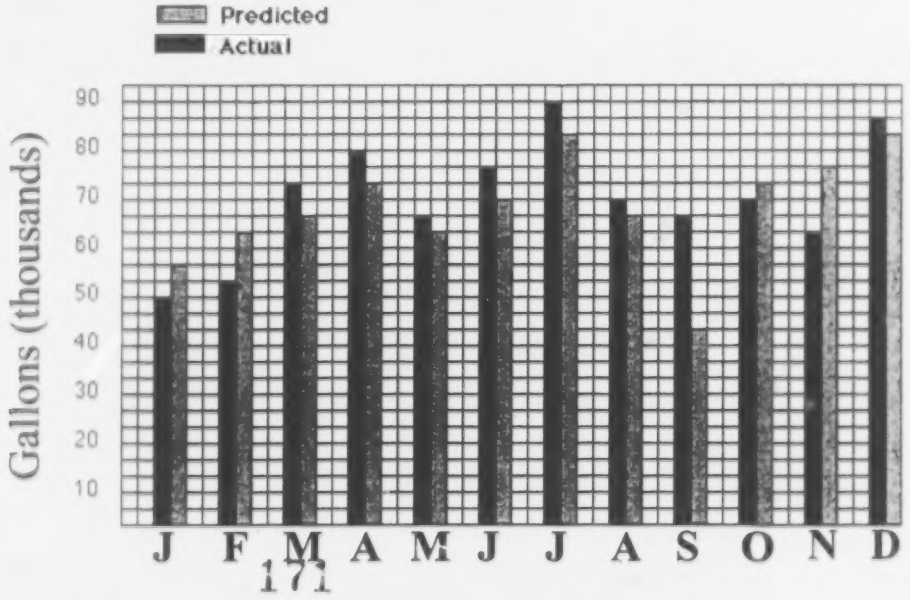
Draw a frequency histogram based on the data. In which interval is the median score?

How many students scored at or below the median?

To get an A on this test, a student had to have a score greater than 92. What is the probability that a student selected at random from this distribution got an A on the test?

This chart shows the actual and predicted gasoline sales for one year. During which month was there the greatest difference between the predicted and actual gasoline sales?

(a) January
(b) May
(c) September
(d) December



There are 42 employees at Martino's Pizza. Sixteen earn $4.75 an hour, four earn $5.50 an hour, three earn $6.85 an hour, six earn $4.85 an hour, and thirteen earn $5.25 an hour. Find the mean hourly wage.

(a) $0.65
(b) $5.14
(c) $5.44
(d) $43.18

Mary's new car is rated at 26 mpg. She drove her new car 390 miles on a tank of gas. Which of the following can be determined from the given information?

(a) approximate capacity of the gas tank
(b) cost of the gasoline
(c) number of days traveled
(d) cost per gallon of gas

The first five figure skating judges gave David scores of 7.2, 7.3, 7.7, 7.8, and 7.5. What score did he need from the sixth judge to average 7.55?

John earned the following test scores this marking period: 77, 92, 81, 93, 87, 80. If John has a choice of which to use for his grade this marking period, the mean or the median, which should he choose?

(a) the mean
(b) the median
(c) either one, they are equal
(d) cannot be determined from the information given

The scores on Ms. Baker's Algebra I test are displayed on the stem and leaf plot.

Algebra I Test Scores

5	1 7
6	2 4 7
7	1 3 4 7 7 8 8 9
8	2 3 3 3 4
9	0 2 3 3 9

What was the median grade on the test?

(a) 78
(b) 79
(c) 82
(d) 83

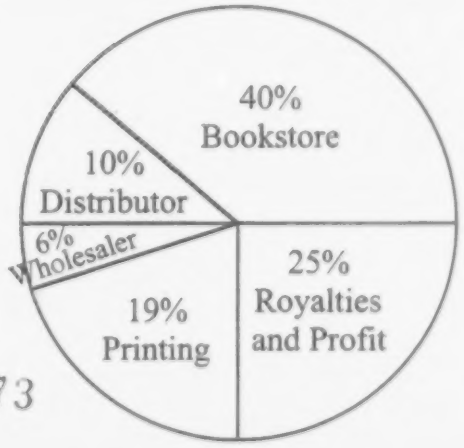
What are the lower and upper quartiles for the distribution of the test scores?

(a) 78 and 79
(b) 71 and 84
(c) 51 and 99
(d) 67 and 90

The graph represents the distribution of funds from the sale of a paperback book. If a paperback costs $4, how much should the bookstore expect to make per book?

(a) $1.60
(b) $2.40
(c) $3.00
(d) $16.00

Earnings from Book Sales



173

A car rental agency has five sports utility vehicles, three full-size cars, and two station wagons for rent. If a vehicle is rented at random, what is the probability it is a sports utility vehicle?

A traffic light is red for 32 seconds, green for 25 seconds, and yellow for 3 seconds. Find the probability that the light will be red at any given time.

A jar contains a total of 20 marbles that are blue, green, or white. The number of white marbles is t' :e more than the number of green marbles, and the number of blue marbles is one more than twice the number of green marbles. How many marbles of each color are in the jar?

Use the information constructed from the previous frame. One marble is randomly selected, its color is noted, and it is returned to the jar. A second marble is randomly selected and its color is noted. Find the probability that both marbles selected are blue; the first marble is green and the second marble selected is white; and one of the marbles selected is red.

174

A softball team plays two games each weekend, one on Saturday and the other on Sunday. The probability of winning on Saturday is $\frac{3}{5}$ and the probability of winning on Sunday is $\frac{4}{7}$. What is the probability of: losing a Saturday game; losing a Saturday game and winning a Sunday game; winning a Sunday game after already winning a Saturday game; winning both games; and losing both games.

If two coins are tossed, the probability of getting two tails is

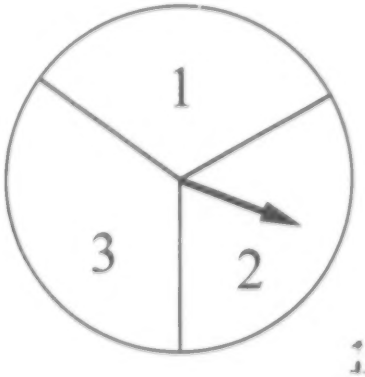
(a) $\frac{1}{2}$

(b) $\frac{1}{3}$

(c) $\frac{1}{4}$

(d) $\frac{1}{8}$

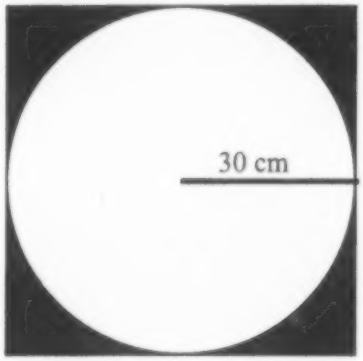
The circle shown is divided into three equal parts. A two-digit number is formed by spinning the spinner twice. The first spin is the tens digit and the second spin is the units digit. List all of the possible outcomes. Find the mean of all numbers that could be formed. Find the probability that a number that could be formed is larger than the mean; a prime number; a number divisible by 5; and a number less than 35.



175

Nancy wants to drive to Asheville from Raleigh by way of Charlotte. She has a choice of two routes from Raleigh to Charlotte and three routes from Charlotte to Asheville. Using only these routes, how many different ways can Nancy drive to Asheville from Raleigh by way of Charlotte?

If the square shown is used for a dart game, what is the probability that a randomly thrown dart will land in the shaded region?



Four people, Marie, Nancy, Becky, and Bill, go to a movie and sit in adjacent seats. If Marie sits in the aisle seat, list all possible arrangements of the other three people.

176

A set of 24 cards is numbered with the positive integers from 1 to 24. If the cards are shuffled and if only one is selected at random, what is the probability thast the number on the card is divisible by four or six?

(a) $\frac{1}{6}$ (b) $\frac{5}{24}$

(c) $\frac{1}{4}$ (d) $\frac{1}{3}$

(e) $\frac{5}{12}$

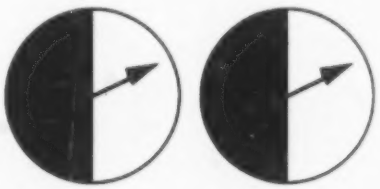
A club has 40 members. In how many ways can a President, Vice President, Secretary, and Treasurer be elected?

(a) 2193360
(b) $8159 \cdot 10^{47}$
(c) 91390
(d) 4

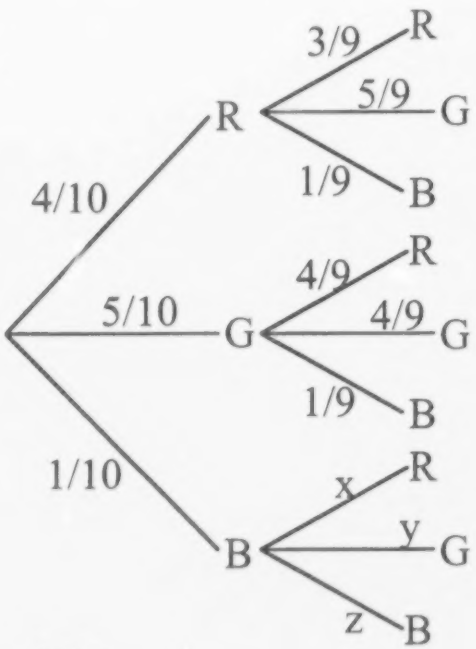
The two fair spinners shown are part of a carnival game. A player wins a prize only when both arrows land on black after each spinner has been spun once. What is the chance of NOT winning?

(a) $\frac{1}{2}$
(b) $\frac{1}{4}$
(c) $\frac{3}{4}$
(d) $\frac{2}{3}$

NAEP



A candy jar has four red gumdrops, five green gumdrops, and one black gumdrop. Without looking, Kim reaches into the jar and chooses one gumdrop. Without replacing this gumdrop, Kim chooses a second gumdrop. The tree diagram represents all possible outcomes with the probability value on each branch.



Find the values of x, y, and z.

Find the probability that both gumdrops chosen are green; one of the gumdrops chosen is red and the other is green; and neither of the gumdrops chosen is red.

177

There are 20 blue marbles, 15 red marbles, and 5 white marbles in a bag. A marble is drawn and not replaced before a second drawing. Find the probability of drawing a red marble followed by another red marble.

(a) $\frac{380}{1560}$

(b) $\frac{400}{1600}$

(c) $\frac{15}{4}$

(d) $\frac{3}{4}$

If the probability that it will rain is 0.7, what is the probability that it will not rain?

Five book are randomly put on a shelf. How many possible arrangements are there?

(a) 5
(b) 10
(c) 120
(d) 287

A jar contains only blue marbles and green marbles. If the ratio of blue marbles to green marbles is 3:2, what is the probability that one marble, selected at random, will be blue?

173

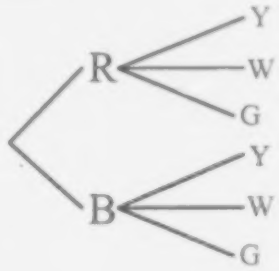
A list of students' favorite snacks according to a recent survey:

Cheese Puffs	43
Peanuts	24
M & M's	33

What is the probability that the next student you see will like Cheese Puffs?

(a) 43%
(b) 24%
(c) 33%
(d) 80%

Mary has two blouses (1 red and 1 blue) and 3 pairs of slacks (1 yellow, 1 white, and 1 green). The tree diagram represents the outfits she can wear. If Mary chooses 1 blouse and 1 pair of slacks at random, what is the probability that the outfit she chooses will include a pair of green slacks?



A red flower is crossed with a white flower. Which diagram shows the possible results?

(A)

	W	W
R	RW	RW
W	WW	WW

(B)

	R	W
R	RR	RW
W	RW	WW

(C)

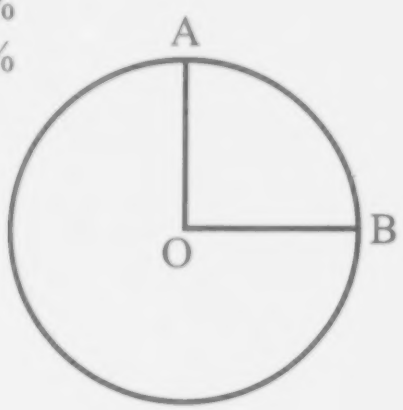
	R	W
R	RR	RW
R	RR	RW

(D)

	W	W
R	RW	RW
R	RW	RW

Using the diagram below, what is the probability that a point picked at random is inside section AOB?

(a) 25%
(b) 90%
(c) 40%
(d) 10%



How many different ways can the letters of the word CHORD be arranged?
How many of the arrangements begin with either an H or an O?
If one of the arrangements is selected at random, what is the probability it will begin with C?

A box of doughnuts contains 4 glazed, 3 cream-filled, and 2 jelly doughnuts. What is the probability of getting a cream-filled doughnut, eating it, and then getting a glazed doughnut?

(a) $\frac{1}{12}$
(b) $\frac{1}{6}$
(c) $\frac{4}{27}$
(d) $\frac{1}{3}$

If a letter is chosen at random from the word BASEBALL, what is the probability that the letter is not an L?

130

How many different license plates can be made using three letters followed by four digits if letters and digits may be repeated?

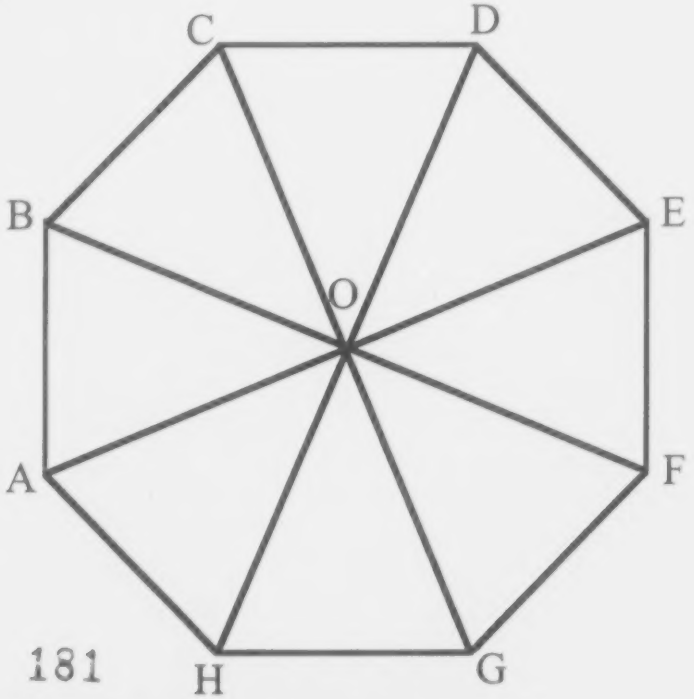
(a) 78,624,000
(b) 88,583,040
(c) 156,000,000
(d) 175,760,000

An eight-sided die is painted as follows: one side is green, two sides are red, three sides are blue, and two sides are yellow. What is the probability that when the die is rolled, a green or yellow side will be face up?

(a) $\frac{1}{8}$
(b) $\frac{1}{4}$
(c) $\frac{3}{8}$
(d) $\frac{3}{4}$

What is the probability that a point inside the polygon is inside quadrilateral HOFG?

(a) $\frac{1}{8}$ (b) $\frac{1}{4}$
(c) $\frac{1}{2}$ (d) $\frac{1}{3}$



181

Sally has three pairs of jeans, five shirts, and four sweaters in her closet. How many different outfits can she make if she selects one pair of jeans, one shirt, and one sweater at a time?

(a) 3
(b) 5
(c) 12
(d) 60

A jar contains marbles of three colors: red, white, and blue. There are ten blue marbles and five white marbles. It is known that the probability that a marble selected at random is red is two-thirds. How many marbles are in the jar?

(a) 20
(b) 30
(c) 45
(d) 50

When playing a board game, two fair dice are thrown. What is the probability that the sum of the dots is five?

(a) $\frac{1}{18}$ (b) $\frac{1}{12}$

(c) $\frac{1}{9}$ (d) $\frac{1}{6}$

A club consists of five women and three men. Two members' names are drawn from a hat to serve on a committee. What is the probability that both names drawn (without replacement) are females?

(a) $\frac{1}{3}$ (b) $\frac{5}{14}$

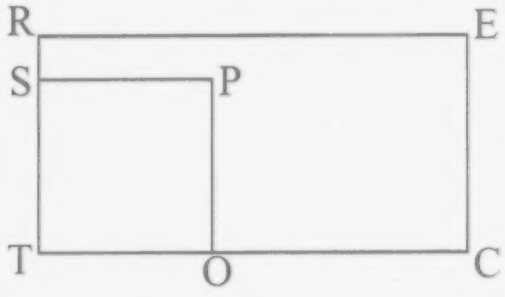
(c) $\frac{3}{8}$ (d) $\frac{1}{2}$

182

RECT is a rectangle with RE = 20 and RT = 10. SPOT is a square with ST = 8. If a point is selected at random inside RECT, what is the probability that the point will be inside SPOT?

(a) $\frac{8}{25}$ (c) $\frac{4}{5}$

(b) $\frac{3}{10}$ (d) $\frac{4}{7}$



A set contains five isosceles trapezoids, three squares, and a rhombus that is not a square. A figure is chosen at random. What is the probability that its diagonals will be congruent?

(a) 1

(b) $\frac{8}{9}$

(c) $\frac{5}{9}$

(d) $\frac{3}{9}$

One black marble and two red marbles are in a bag. Erika picks a marble from the bag at random. She looks at it, returns it, and makes a second random selection.

Draw a tree diagram or list the sample space showing all possible outcomes.
What is the probability that two red marbles were selected?
What is the probability that two black marbles were selected?
What is the probability that one black and one red marble were selected?
What is the probability that at most one black was selected?

The table shows how randomly selected students responded to a poll about how frequently they eat fast food.

Survey Results

	Freshman	Sophomore	Junior	Senior	
never	15	13	12	8	48
sometimes	11	13	20	25	69
often	7	8	10	15	40
	33	34	42	48	157

What is the probability that a student selected from the group is a freshman or doesn't eat fast food?

(a) $\frac{15}{157}$ (b) $\frac{33}{157}$

(c) $\frac{66}{157}$ (d) $\frac{81}{157}$

What is the probability that a student selected from the group is a freshman and doesn't eat fast food?

(a) $\frac{15}{157}$ (b) $\frac{33}{157}$

(c) $\frac{66}{157}$ (d) $\frac{81}{157}$

What is the probability that a student selected is a sophomore or junior and eats fast food often?

(a) $\frac{18}{157}$ (b) $\frac{2}{157}$

(c) $\frac{76}{157}$ (d) $\frac{22}{157}$

What is the probability that a student selected is not a senior?

(a) $\frac{8}{157}$ (b) $\frac{109}{157}$

(c) $\frac{40}{157}$ (d) $\frac{48}{157}$

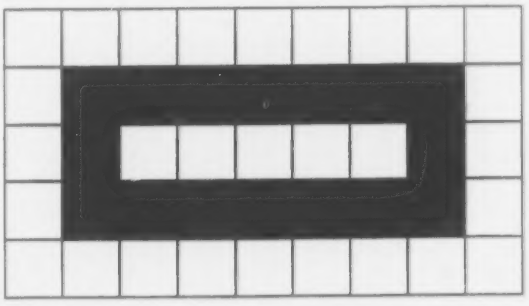
181

The call letters of radio and television stations in the United States and east of the Mississippi River begin with the letter W, as in WUNC and WBT. How many different three- and four-letter call letters are possible for stations east of the Mississippi?

In a three-game playoff series, the probability that team A will win each game is twice the probability that team B will win. What is the probability that team B will when the series?

A bag contains small straws of the following lengths: 2cm, 3 cm, 5 cm, 7 cm, 11 cm, and 13 cm. Three straws are drawn at random. What is the probability that a triangle can be formed with the straws that are drawn?

What is the chance of hitting the shaded region?



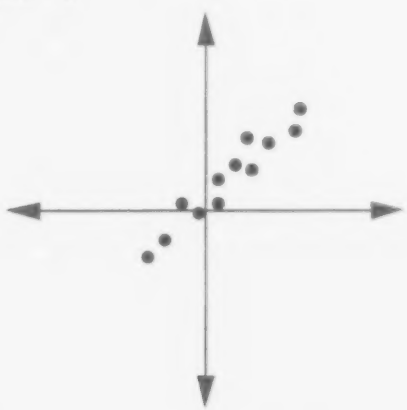
Which type of equation best fits the data shown in the graph?

(a) $y = ax^2$
(b) $y = a\sqrt{x}$
(c) $y = a\ b^x$
(d) $y = ax + b$

Given a set of data, what should you do first to find a line of best fit?
(a) Draw a line through the first and last points.
(b) Find the means of all the x's and y's.
(c) Graph the ordered pairs on the coordinate grid.
(d) Draw a line through the middle point that intersects the last point.

If a line were fit to the data shown in the graph, how would the slope of that line best be described?

(a) positive
(b) negative
(c) ∞
(d) 0



$100 has been put into a savings account paying 2% interest, compounded quarterly. How much will be in the account at the end of 20 years?

(a) $200
(b) $146.05
(c) $152.04
(d) $149.03

136

Country	Area (mi^2)	Population
Afghanistan	250,000	16,900,000
Bahamas	5,380	300,000
Cameroon	183,570	12,700,000
Nicaragua	50,190	4,100,000
Norway	125,180	4,300,000
Peru	496,220	22,500,000
USA	3,615,100	255,600,000

Assuming that the relationship between population and area is a linear one, use the information provided to create a linear model of that relationship.

According to the model, what would be the approximate population of a country with an area of 350,000 square miles?

China's estimated 1996 population was 1.2 billion people and its area is 3,691,521 square miles. What is the approximate error in the linear model's estimation of China's population?

Based on the following table, predict the postal rate for the year 2010.

1958	4¢	1978	15¢
1963	5¢	1981	18¢
1968	6¢	1985	22¢
1971	8¢	1988	25¢
1974	10¢	1991	29¢
1975	13¢	1995	32¢
		1999	33¢

(a) 40¢
(b) 43¢
(c) 50¢
(d) 55¢

The data were collected in Mr. Beale's Algebra class. Let height (in inches) be the independent variable x and weight (in pounds) be the dependent variable. Find a linear equation of best fit for the data. According to the equation, how tall would you expect an 82-pound person to be?

(a) 57 inches
(b) 54 inches
(c) 52 inches
(d) 49 inches

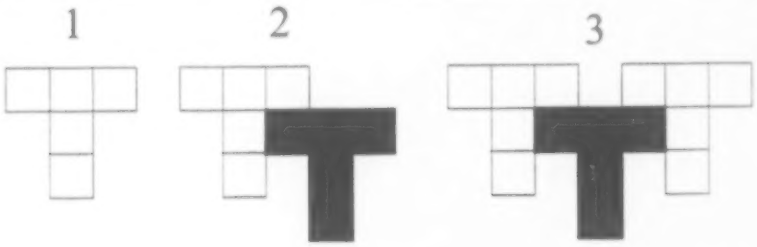
Height	Weight
74	180
64	115
72	170
68	140
60	105
70	165
65	125
69	150
69	160
69	155
68	145

In 1997 a British jet-powered car broke the sound barrier and set a new land speed record. Using the historical data provided (year, mph), find the equation for a line of best fit and estimate the 1997 time.
How close was the estimated result to the offical time? Express the difference as a percent of the offical time (percent error).

1906	127.659	1929	231.446	1939	368.9
1910	131.724	1931	246.086	1947	394.2
1911	141.732	1932	253.96	1963	407.45
1919	149.875	1933	272.109	1964	536.71
1920	155.046	1935	301.13	1965	600.601
1926	170.624	1937	311.42	1970	622.407
1927	203.790	1938	357.5	1983	633.6
1928	207.552				

Week	Total Gross Income (millions)
1	28.638
2	88.425
3	157.467
4	197.881
5	242.748
6	274.599
7	308.1
8	337.355
9	376.27
10	402.561
11	426.983
12	449.157

The 1998 movie Titanic was one of the top money-earning movies of all time. Using the data provided, find a line of best fit. Define the slope in terms of the information provided. When would you expect sales to have reached the $500 million mark? Is it safe to predict that sales will reach the $1billion mark? Explain.



Create a linear equation which models the sequence of geometric figures shown based on the number of squares in each figure. Based on that linear model, how many squares would be needed to construct the 17th figure in the sequence? Suppose each small square used to construct the figures measured 3.2 cm on a side. How would that change your linear model?

Create a linear equation which models the sequence of geometric figures shown based on the perimeter of each figure. What would the perimeter of the 13th figure be? Suppose each small square measured 7.1 cm on a side. What would the equation be now?

Summer Olympics
Women's 400 Meter
Free-Style Results

(times are in seconds)

1924	362.2
1928	342.8
1932	328.5
1936	326.4
1948	317.8
1952	312.1
1956	294.6
1960	290.6
1964	283.3
1968	271.8

Create a linear model for the data shown. Estimate the results for 1940 and 1944. If your model is accurate, what should the results have been at the 1996 Atlanta Olympics? Assuming the linear expression is in $y = ax + b$ form, what do a and b represent in the context of the data?

Cable TV
Subscribers

(millions)

1965	1.5
1970	5.1
1975	9.8
1980	17.7
1985	39.9

The expression $y = 1.5(1.169)^{(x-1965)}$ models the growth of the cable television industry shown at the left. According to this model, how many subscribers should there be in 2000? Would a linear expression better model the data shown? Explain using a graph. There were 63 million cable subscribers in 1995. How well do the two models predict 1995's data? Can we expect the growth in this industry to continue? Why or why not?

Resources for Grade Ten Mathematics
Answer Key

1.01 The learner will perform operations with real numbers.	pp. 186 - 187
1.02 The learner will solve problems involving number theory.	pp. 187 - 189
1.03 The learner will use ratios, proportions, and percents to solve problems.	pp. 189 - 190
2.01 The learner will solve geometric problems using two- and three-dimensional shapes.	pp. 190 - 193
2.02 The learner will use properties of angles, lines, and planes to solve problems.	pp. 193 - 194
2.03 The learner will understand and use perimeter, area, and volume formulas to solve problems.	pp. 195 - 197
2.04 The learner will solve problems using triangle relationships.	pp. 197 - 198
2.05 The learner will transform polygons in the coordinate plane.	pp. 198 - 199
3.01 The learner will use the language of algebra and formulas to solve problems.	pp. 200 - 201
3.02 The learner will demonstrate an understanding of relations and functions.	pp. 201 - 203
3.03 The learner will graph and use linear equations and inequalities.	pp. 203 - 206
3.04 The learner will solve problems that involve nonlinear equations.	pp. 206 - 207
3.05 The learner will use an appropriate method to solve problems involving systems of equations and inequalities.	pp. 207 - 209
3.06 The learner will perform operations with polynomials.	pp. 209 - 211
4.01 The learner will use statistics to analyze and solve real-world problems.	pp. 211 - 213
4.02 The learner will use probability to solve real-world problems.	pp. 213 - 215
4.03 The learner will fit a line or curve to a set of data and use this line or curve to make predictions about data.	p. 215

1.01: page 2

(c) (c)

(a) Charlotte-San Francisco, 2720 miles, ~3.6 hours

1.01: page 3

(b) (c)

(d) (c)

1.01: page 4

(d) -36

$1800.58 2

1.01: page 5

b) (c)

(b) (d)

1.01: page 6

(c) (b)

(c) (a)

1.01: page 7

42 (c)

742.82 mph (b)

132

1.01: page 8

34

New York-Los Angeles 2451 miles, 39.5 min

$3^{75}, 5^{50}, 2^{100}$ (c)

1.01: page 9

96% 16.8 minutes

16,000 4.3 seconds

1.01: page 10

-4 (c)

24, 24, 6 (c)

1.01: page 11

$2.53 \cdot 10^5$ -48

13,593,447 9 days

1.02: page 12

720 (c)

(a) 52

193

1.02: page 13

17 170

(c) 20•22 array of squares plus one square hanging off bottom left and one hanging off top right; 442 squares

1.02: page 14

64

odd
even
odd

1.02: page 15

(b) (b)

5, 17, 23 150

1.02: page 16

15 (b)

(c) 4.3218, 3.02526

1.02: page 17

(d) (c)

$\frac{1}{n} =$ (d)

$\frac{1}{n+1} + \frac{1}{n(n+1)}$

1.02: page 18

$\frac{81}{256}$

(c) 786

1.02: page 19

1800° 50

11 $2^9 + 2^8 + 2^7 + 2^6 + 2^5 + 2^3 + 2^0$

194

1.02: page 20

52 centimeters,
$4n + 4$

36 squares,
7 figures

1.02: page 21

$49 + 4$ or
$36 + 16 + 1$

19

201, 203

-46, -48, -50,
-52, -54

1.03: page 22

(a) (d)

(b) (d)

1.03: page 23

144%

Martin

(b)

4.2 grams

1.03: page 24

2 feet

36

10

300 km

1.03: page 25

(c)

(b)

5

(c)

1.03: page 26

(c) {6, -2}

(d) (a)

1.03: page 27

Angela, 625
equal,
Angela

8.9% $11.70

1.03: page 28

12 cm 54%

area 12 shots
reduced
by 22%

1.03: page 29

(c) 112 or 113

559% $25\pi - 48$

1.03: page 30

(b) Earth: 2.5 yd line
Jupiter: 13 yd line

20 Japan

2.01: page 32

(d) 60°

110° (d)

136

2.01: page 33

61° 6:4 or 3:2

(c)

2.01: page 34

(a) 2

210 units^2 (d)

2.01: page 35

10, 8, 6, 72 units^2, 120 units^2

(d) 30°

2.01: page 36

5 36°

15 units^2 10

2.01: page 37

12

8 (1, 2)

2.01: page 38

25 20°

(c) 80°

197

2.01: page 39

(b)

(b) (a)

2.01: page 40

(c) (d)

(b) (d)

2.01: page 41

(d) (b)

8

2.01: page 42

(b) (c)

BC 72°

2.01: page 43

C

(d) (a)

2.01: page 44

(b) (a)

(d) (d)

193

2.01: page 45

45o (c)

12-gon 15.5

2.01: page 46

9 AB

(c) (d)

2.02: page 47

(b) 19

70° 15

2.02: page 48

13 21

30° (d)

2.02: page 49

70° (a)

10 60°

2.02: page 50

60° (a)

50 30

193

2.02: page 51

25 47

9, 54 units^2, 228 units^2, 174 units^2, 60 units^2

2.02: page 52

83° 50°

(c) (c)

2.02: page 53

(c)

142°

2.02: page 54

(a) (a)

65° 80°

2.02: page 55

(c)

(a)

2.02: page 56

6, -9, 0 40°

(a)

2.03: page 57

24

154 units^2, 17.8

83.4 units^2, 13%

4.9

2.03: page 58

(c)

(c)

(e)

48.1

2.03: page 59

(c)

20000 cm^2

(b)

(d)

2.03: page 60

(a)

40 units^2

(a)

(b)

2.03: page 61

24

(c)

6

8.5 units^2

2.03: page 62

(a)

(c0

(a)

(d)

2.03: page 63

(d) (b)

(c) (d)

2.03: page 64

(c) (b)

(b) (c)

2.03: page 65

(a) (c)

(d) (b)

2.03: page 66

7 units^2 11 m

2.3, 4.9 108

2.03: page 67

431.5 in^2 10 units^2

44 (c)

2.03: page68

336.96 cm^2 378 cm^2

900.375 cm^3 272 cm
686 cm^2

202

2.03: page 69

1111.11 cm^3 90 cm^2

(a) 16 cm^2

2.04: page 70

9 25 cm

10 (b)

2.04: page 71

(d) 155.3

(c) 5, 12, 13

2.04: page 72

(a) (b)

(b) (b)

2.04: page 73

8.6 (a)

0.6 13°

2.04: page 74

7.5 (d)

33.6 (c)

203

2.04: page 75

(c) (b)

(d) (b)

2.04: page 76

225 units^2 113.1

(b) (a)

2.04: page 77

16 24.5°

69.7 cm (d)

2.04: page 78

(b) (d)

5.1 miles (b)

2.04: page 79

4 4.5, 44.1

(b) 39.7, 8.4

2.05: page 80

(a) (c)

(d) (a)

2.05: page 81

(b)

(b)

2.05: page 82

(3, 2) (-4, 4)

(a) (5, 1)

2.05: page 83

(a) 4

(b) (-5, -3)

2.05: page 84

(b) A′(-1, 4)
B′(-5, 1)

(-6, 7) (c)

2.05: page 85

(c)

(a)

2.05: page 86

F (c)

3 (d)

3.01: page 88

-18 (d)

(a) 2n - 4

3.01: page 89

12 (a)

9, 11, 13 40

3.01: page 90

(b) (e)

(d) 6

3.01: page 91

3 (b)

{-4, 5} 13
{-5, 4}

3.01: page 92

(b) (d)

(a) (b)

3.01: page 93

(a) (d)

(a) (a)

206

3.01: page 94

(c) (a)

12% (d)

3.01: page 95

(c) 18

30° 12

3.01: page 96

(c) 4.9

4 cm (c)

3.01: page 97

(c) (b)

18 (b)

3.02: page 98

(a) 2

(d) (d)

3.02: page 99

(d) (2, 1)

$(\frac{1}{3}, \frac{8}{3})$

(a) (b)

207

3.02: page 100

(d)

(c) (a)

3.02: page 101

(b)

3.02: page 102

(c)

3.02: page 103

(a)

3.02: page 104

(d)

3.02: page 105

(b)

(c)

208

3.02: page 106

(a) or (b), depending on how well a student can justify their driving techniques.

3.02: page 107

(b)

Let students bring in samples from newspapers and magazines.

3.03: page 108

6 2

7 (b)

3.03: page 109

(b) (d)

1 -6

3.03: page 110

3 (b)

3 (c)

3.03: page 111

$\frac{b+c}{a}$ 1.98

$x \leq 3.2$ 0.10

3.03: page 112

27 20

48 (d)

3.03: page 113

1 14

18 $\frac{b-a}{2}$

3.03: page 114

(a)

(d)

3.03: page 115

(b) $\frac{2}{9}$

(c) (b)

3.03: page 116

(b)

(a)

3.03: page 117

(c) (a)

(d) (d)

210

3.03: page 118

(d)

(c)

3.03: page 119

(a) (c)

(b) (d)

3.03: page 120

(b)

(d)

3.03: page 121

(d) (c)

(c) (c)

3.03: page 122

(d) (a)

(c) (b)

3.03: page 123

(b) (d)

(d) (a)

211

3.03: page 124

(a)

(d)

3.04: page 125

(b) 22 or 23, 4

$(x + 4)(x - 4)$ (d)

3.04: page 126

(a) {3, -3}

(c) 8

3.04: page 127

(c) {-3, -1}

(b) (d)

3.04: page 128

(b) (a)

(d) (c)

3.04: page 129

(b)

(a)

212

3.04: page 130

(c) (a)

(b) (a)

3.04: page 131

(c) (d)

(d)

3.04: page 132

(b) (c)

(c) (c)

3.04: page 133

(c)

$2,878,147.60 49, 50 or -50, -49

3.04: page 134

(a) (d)

(a) (a)

3.05: page 135

6 answers will vary

(-2, 3) 6

3.05: page 136

(3, 0)

37.5 units2

(2, 5)

(2, 2)

3.05: page 137

(c)

(2, 3)

answers will vary

(2, -2)

3.05: page 138

answers will vary

(b)

(a)

(7, -1)

3.05: page 139

(b)

3.05: page 140

(a)

(b)

(c)

(b)

3.05: page 141

(d)

(b)

(c)

3.05: page 142

(d)

(b)

SS = 150
TS = 250

$3.54

3.05: page 143

(d)

3.05: page 144

3

105

answers will vary

answers will vary

3.06: page 145

$x^2 - x - 6$

$2x^2 - 4x + 12$

$8x + 1$

$x(x + 5)$

3.06: page 146

(b)

(b)

(c)

$(x + 2)(x + 4)$

3.06: page 147

(a)

$2x^2 + 7x - 15$

$x^2 + 5x - 8$

(d)

3.06: page 148

$\frac{9x}{2}$ $(3 + y)(3 - y)$

(a) (d)

3.06: page 149

$(2x - 3)(x + 1)$ $\frac{7a}{18}$

(b) $x^2 + 8x - 12$

3.06: page 150

(a) (d)

(d) (c)

3.06: page 151

(d) (b)

(b) (a)

3.06: page 152

(c) (d)

(c) (a)

3.06: page 153

(d) (c)

(b) (c)

3.06: page 154

(d) (d)

(c) (d)

3.06: page 155

(c) (c)

$x(x + 3)(x + 2)$ (a)

3.06: page 156

(d) (a)

(d) (b)

4.01: page 158

56-65 90%

13 5

4.01: page 159

60

4.01: page 160

A: median (a)
B: mean

20 8

217

4.01: page 161

Frequency	Cumulative Freq.
5	5
1	6
5	11
3	14
4	18
2	20

(b) (b)

4.01: page 162

(c) (c)

4
6
7 (b)
1
2

4.01: page 163

(c) (d)

(a)

4.01: page 164

(a) 41

(d) 3

4.01: page 165

86-90, 22, $\frac{9}{44} < P < \frac{16}{44}$

(c)

4.01: page 166

(b) (a)

7.8 (a)

213

4.01: page 167

(a) (b)

(a)

4.02: page 168

$\frac{5}{10}$ $\frac{32}{60}$

G = 4 $\frac{81}{400}$

W = 7 $\frac{28}{400}$

B = 9 0

4.02: page 169

$\frac{2}{5}, \frac{8}{35}, \frac{4}{7},$ (c)

$\frac{12}{35}, \frac{6}{35}$

$\frac{4}{6}, \frac{3}{6}, 0, \frac{6}{6}$

4.02: page 170

6 21%

N, Be, Bi (d)
N, Bi, Be
Be, N, Bi
Be, Bi, N
Bi, N, Be
Bi, Be, N

4.02: page 171

(a) (c)

$\frac{4}{9}, \frac{5}{9}, 0$

$\frac{20}{90}, \frac{40}{90}, \frac{30}{90}$

4.02: page 172

(a) 0.3

(c) $\frac{3}{5}$

219

4.02: page 173

(a) $\frac{2}{6}$

(D)

4.02: page 174

(a) 120, 48, $\frac{1}{5}$

(b) $\frac{6}{8}$

4.02: page 175

(d) (c)

(b)

4.02: page 176

(d) (c)

(c) (b)

4.02: page 177

(a) (b)

$\frac{4}{9}, \frac{1}{9}, \frac{4}{9}, \frac{8}{9}$

4.02: page 178

(c) (a)

(a) (b)

220

4.02: page 179

18,252

$\frac{7}{27}$

$\frac{1}{4}$

$\frac{16}{45}$

4.03: page 180

(d)

(c)

(a)

(d)

4.03: page 181

22,058,405
error: 940,075,813 or 78%

(b)

4.03: page 182

(a)

1997 record: 763.035
'97 estimate: 769.966
error: 6.931 or 0.91%

4.03: page 183

week 16

$y = 5x$, 85, $y = 51.2x$
$y = 8x + 4$, 108, $y = 56.8x + 28.4$

221

4.03: page 184

1940: 324.9, 1944: 317.9
1996: 227.3
a: record decreases by 1.7 sec per year
b: meaningless; 1924 was the first year women competed in the event

2000: 297 million
other answers will vary